

PROCEEDINGS

OF

(76)

THE GOVERNMENT OF INDIA

IN

THE DEPARTMENT OF REVENUE AND AGRICULTURE

FOR THE MONTH OF

JANUARY, 1899.

METEOROLOGY.

PRESENT :

HIS EXCELLENCY THE RIGHT HONOURABLE VICTOR ALEXANDER BRUCE, EARL OF ELGIN AND KINCARDINE,
G.M.S.I., G.M.I.E., VICEROY AND GOVERNOR GENERAL OF INDIA (*to 5th January*).

HIS EXCELLENCY THE RIGHT HONOURABLE GEORGE NATHANIEL BARON CURZON OF KEDLESTON, G.M.S.I.,
G.M.I.E., VICEROY AND GOVERNOR GENERAL OF INDIA (*from 6th January*).

HIS EXCELLENCY SIR WILLIAM STEPHEN ALEXANDER LOCKHART, G.C.B., K.C.S.I., COMMANDER-IN-CHIEF IN
INDIA.

THE HONOURABLE SIR JAMES WESTLAND, K.C.S.I.

THE HONOURABLE MR. MACKENZIE DALZELL CHALMERS, C.S.I.

THE HONOURABLE MAJOR-GENERAL SIR EDWIN HENRY HAYTER COLLEN, K.C.I.E., C.B.

THE HONOURABLE SIR ARTHUR CHARLES TREVOR, K.C.S.I.

THE HONOURABLE MR. CHARLES MONTGOMERY RIVAZ, C.S.I.



CALCUTTA :

OFFICE OF THE SUPERINTENDENT OF GOVERNMENT PRINTING, INDIA.

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1 to 4	<i>From the Secretary to the General Committee of the G. V. Jugga Rao Observatory, No. 587 S., dated 7th October 1898.</i> —Proposes that two local members should be added to the Executive Committee of the Observatory, and that the Port Officer and the Superintendent of Telegraphs, Vizagapatam, should be appointed additional members.	A Pros., Jan. 1898, Nos. 48 to 59. (File No. 46 of 1897.) A Pros., April 1898, No. 1. (File No. 25 of 1898.)	2	1
	<i>To the Government of Madras, No. 2867—25-3, dated 21st October 1898.</i> —Forwards a copy of Serial No. 2, and enquires whether the Governor in Council has any objection to the proposals.	...	3	1
	<i>From the Government of Madras, No. 1444, dated 30th November 1898.</i> —In reply to Serial No. 3, states that the Government of Madras has no objection to the proposals.	...	4	1
	<i>To the Secretary, General Committee, G. V. Jugga Rao Observatory, No. 108—25-5, dated 10th January 1899.</i> —Approve the proposal made in Serial No. 2. (Copy forwarded to the Government of Madras for information, with reference to their letter No. 1444 (Public), dated 30th November 1898 (No. 109—25-5, dated 10th January 1899). Copy of the correspondence forwarded to the Public Works Department for information (No. 110—25-5, dated 10th January 1899).	...	5	2
	<i>FILE No. 51 of 1898.</i>			
	<i>Transfer of the Madras Observatory from Provincial to Imperial control and the removal to Kadaikanal of certain instruments, etc., purchased for the Solar Physics Observatory at that station.</i>			
5 to 8	<i>From the Government of Madras, No. 1281, dated 17th October 1898.</i> —Forwards a copy of the Government Astronomer's letter No. 161, dated 30th August	A Pros., Oct. 1898, No. 1. (File No. 51.)	2	3

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	1898, containing proposals regarding the transfer of the Madras Observatory to the Government of India in connection with the establishment of the Solar Physics Observatory at Kodaikanal and the removal to Kodaikanal of certain instruments, etc., purchased for the latter institution. Requests that the expenditure that will be involved in the transfer of instruments may be provided by the Government of India.			
	<i>From the Financial Department, No. 4804 A., dated 3rd November 1898.</i> —Forwards a copy of letter to the Government of Madras, stating that pending the formal transfer of the Kodaikanal Observatory to the Government of India the charges on account of apparatus, etc., connected with the observatory will continue to be recorded under the Provincial head "Observatory," but that a special assignment for the expenditure will be made from Imperial to Provincial through the Land Revenue head.	...	3	4
	<i>To the Government of Madras, No. 3212—51-4, dated 18th November 1898.</i> —Sanctions Mr. Michie-Smith's moving up to Kodaikanal about January 1899 and removing to that station certain instruments and books, etc., purchased for the Kodaikanal Observatory. Adds that there is no objection to the expenditure required for the removal of the instruments, etc., being incurred, the charge being adjusted in the manner indicated in Serial No. 3.	...	4	4
	<i>To the Meteorological Reporter to the Government of India, No. 3347, dated 2nd December 1898.</i> —Asks for detailed estimates showing separately the provision required for the different parts of the new observatory scheme. (For reply <i>vide</i> File No. 10 of 1898.)	...	5	4

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	FILE No. 9 of 1898.			
	<i>Reorganisation of Indian Scientific Observatories.</i>			
1 to 12	<i>Despatch from Her Majesty's Secretary of State for India, No. 173, dated 22nd September 1898.</i> —Forwards for consideration a copy of reports by the Astronomer Royal and Sir J. Norman Lockyer, and of a letter, dated 27th July 1898, from the Royal Society, in reference to the proposed reorganisation of Indian Observatories.	A Pros., Jan. 1899, Nos. 5 to 8. (File No. 51 of 1898.) L. S., A Pros., Sept. 1898, No. 12. (File No. 68.) A Pros., July 1898, Nos. 7 to 14. (File No. 9.)	13	5
	<i>Telegram to the Government of Madras, No. 2818, dated 15th October 1898.</i> —Intimates that the construction of the observatory building at Kodaikanal should continue, and that early completion is desirable.	L. S. A Pros., June 1898, Nos. 1 and 2. (File No. 69.) A Pros., Jan. 1898, Nos. 34 to 43. (File No. 68 of 1897.) A Pros., Sept. 1897, Nos. 1 to 3. (File No. 11 of 1896.)	14	47
	<i>To the Meteorological Reporter to the Government of India, No. 3195—9-15, dated 18th November 1898</i> —Forwards a copy of Serial No. 13, and asks for his views on the scheme of reorganisation.	A Pros., June 1897, No. 1. (File No. 12.) A Pros., Nov. 1896, Nos. 1 to 7. (File No. 11.) A Pros., Dec. 1893, Nos. 1 to 7. (File No. 14.)	15	47
	<i>From the Meteorological Reporter to the Government of India, No. 757 S., dated 29th November 1898.</i> —Communicates his views on the scheme.	A Pros., June 1897, No. 1. (File No. 12.) A Pros., Nov. 1896, Nos. 1 to 7. (File No. 11.) A Pros., Dec. 1893, Nos. 1 to 7. (File No. 14.)	16	47
	<i>Telegram from the Meteorological Reporter to the Government of India, dated 9th December 1898.</i> —Enquires if the Observatories Committee will meet before 12th instant.	A Pros., June 1898, Nos. 10 to 15. (File No. 14.)	17	50
	<i>Telegram to the Meteorological Reporter to the Government of India, No. 3397—9-15, dated 12th December 1898.</i> —Intimates that the Observatories Committee will meet on the 19th instant.		18	50
	<i>Despatch to Her Majesty's Secretary of State for India, No. 14, dated 2nd February 1899.</i> —Forwards a copy of Serial No. 16 and of the Proceedings of a Departmental Committee which met to consider the matters discussed in the paper forwarded with Serial No. 13, and submits proposals regarding the reorganisation of Indian Observatories.	...	19	51
	Copy, and enclosures, with a copy of Serial No. 13, forwarded to the Finance Department for information (No. 435—9-19, dated 2nd February 1899).			

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1 to 12 —contd.	FILE No. 9 of 1898—contd.			
	Copy, with a copy of the Proceedings of the Departmental Committee, and of a statement of the financial effect of the scheme, forwarded to the Meteorological Reporter to the Government of India for information (No. 436—9-19, dated 2nd February 1899).			
	<i>To the Surveyor General of India, No. 468—9-20, dated 13th February 1899.</i> —Forwards a copy of Serial Nos. 13 and 19, and enquires what arrangements he proposes for the conduct of the fundamental magnetic survey.	...	20	61
	<i>To the Government of Bombay, No. 434—9-21, dated 9th February 1899.</i> —States that it is proposed to maintain the existing establishment at Colaba, that from 1st April next the administrative control of the Observatory shall be transferred to the Meteorological Reporter to the Government of India, and that the necessary budget provision for the Observatory will be made in the India Estimates for 1899-1900. Enquires if Mr. N. A. Moos can be allowed to retain his lien on his appointment in the Education Department until the future position of the Colaba Observatory in the general scheme is finally determined.	...	21	63
	<i>From the Government of Madras, No. 227, dated 23rd February 1899.</i> —Enquires whether the transfer to the Government of India of the charges connected with the establishment of the Kodaikanal Observatory is likely to take place at an early date.	...	22	65
	<i>To the Government of Madras, No. 873—9-23, dated 8th March 1899.</i> —Intimates that, in anticipation of the Secretary of State's approval of the scheme, it is proposed to give effect from the 1st April 1899 to the arrangements agreed to in the Madras Government's letter No. 941, dated 21st November 1893, regarding the Madras Observatory and the Solar Physics Observatory, that the Meteorological Reporter to the Government of India has been informed accordingly, and that the necessary provision has been made in the India Estimates for 1899-1900.	...	23	67
13 to 20	<i>To the Meteorological Reporter to the Government of India, No. 875—9-24, dated 9th March 1899.</i> —Forwards a copy of Serial Nos. 21 and 23, and states that the administrative control of the Madras and Kodaikanal Observatories and the Observatory at Colaba should be taken over by him from the 1st April 1899, from which date the Observatories will be placed directly under the Supreme Government. Adds that he should take the necessary action to carry out these orders and arrange for the future location of the Madras Meteorological Office and the appointment of a successor to Miss Pogson who retires from 1st April 1899.	...	24	69
	Copy, with copy of enclosures, forwarded to the Finance Department for information (No. 876—9-24, dated 9th March 1899).			
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	<i>From the Meteorological Reporter to the Government of India, No. 3082, dated 4th November 1898.</i> —Forwards a copy of the Budget Estimate of the Meteorological Department for the year 1899-1900.	A Pros., Mar 1899, Nos. 1 to 12. (File No. 9 of 1898.) A Pros., Jan. 1899, Nos. 5 to 8.	5	71
	<i>From the Comptroller, India Treasuries, No. S. D.—1878, dated 20th December 1898.</i> —Forwards, for consideration and orders, the Budget Estimate of the Meteorological Department for 1899-1900, with a statement of changes proposed in the Estimate.	(File No. 51 of 1898.) A Pros., Sept. 1897, Nos. 1 to 5, (File No. 11 of 1896.) A Pros., Nov. 1896, No. 1 to 7.	6	71
	<i>To the Meteorological Reporter to the Government of India, No. 51—10-7, dated 5th January 1899.</i> —Enquires what additions will be required to the pro-	(File No. 11 of 1896.) A Pros., Dec. 1893, Nos. 1 to 7. (File No. 14.)	7	72

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	<i>From the Meteorological Reporter to the Government of India, No. 31 S., dated 10th January 1899.</i> —Furnishes the information asked for in Serial No. 7.	B Pros., Jan. 1898, Nos. 15 and 16. (File No. 10 of 1898.)		
	<i>From the Meteorological Reporter to the Government of India, No. 29 S., dated 9th January 1899.</i> —In reply to this Office No. 3347—51-S., dated 2nd December 1898, submits the detailed Estimates for 1899-1900 of the Colaba, Kodaikanal, and Madras Observatories.	...	9	72
	<i>From the Finance Department, No. 656 A., dated 9th February 1899.</i> —Forwards a copy of a letter to the Comptroller, India Treasuries, containing orders on the Budget Estimates of the Meteorological Department and Scientific Observatories for 1899-1900.	...	10	81
	<i>To the Meteorological Reporter to the Government of India, No. 540—10-11, dated 22nd February 1899.</i> —Forwards a copy of Serial No. 10, and states that a separate communication will be made to him on the subject of paragraph 6 of his letter No. 29 S., dated 9th January 1899.	...	11	85
21 and 22	<i>To the Meteorological Reporter to the Government of India, No. 1014, dated 25th March 1899.</i> —Informs him that the instruments required for the Colaba, Madras, and Kodaikanal Observatories should be included in his annual indents of stores required from Europe, and that forecasts of such demands should also be included in his estimates of stores of European manufacture.	...	12	85
	<i>FILE No. 16 of 1899.</i>			
	<i>Formation of a magnetic survey party.</i>			
21 and 22	<i>From the Surveyor General of India, No. 677 S., dated 25th February 1899.</i> —With reference to this Office No. 468—9-20, dated 13th February 1899, submits proposals for the conduct of the fundamental magnetic survey.	A Pros., Mar. 1899, Nos. 1 to 12. (File No. 9 of 1898.)	1	87
	<i>Despatch to Her Majesty's Secretary of State for India, No. 27, dated 30th March 1899.</i> —Asks for sanction to the deputation of Captain H. A. D. Fraser, R.E., to England for a period of two months from the date of his arrival in England for the purpose of consulting Professor Rücker as to preliminary details of the survey.	...	2	89
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1 to 4	<i>From the Meteorological Reporter to the Government of India, No. 553-S., dated 28th September 1898.</i> —Submits proposals for strengthening the staff of the Meteorological Department.	A Pros., Mar. 1899, Nos. 1 to 12. (File No. 9 of 1898.) A Pros., May 1898, Nos. 1 and 2. (File No. 31.)	1	93
	<i>To the Meteorological Reporter to the Government of India, No. 3291-57-2, dated 28th November 1898.</i> —Asks for a proposition statement showing all the establishment changes (including those in the number and pay of observers) and for an approximate estimate of the cost of the instruments and also of the expenditure on buildings and other fittings for the proposed new observatories. Enquires whether the cost of an observatory on the Chor can be safely estimated not to exceed Rs 40 a month. Sanctions the closing of certain observatories from 1st January 1899. Copy forwarded to the Finance Department for information (No. 3292-57-2, dated 28th November 1898).	A Pros., Jan. 1898, Nos. 45 to 47. (File No. 73 of 1897.) A Pros., April 1895, Nos. 1 to 4. (File No. 31.) A Pros., May 1890, Nos. 1 to 3. (File No. 11.) A Pros., Mar. 1889, Nos. 2 to 9. (File No. 1 of 1889.)	2	105
	<i>From the Meteorological Reporter to the Government of India, No. 22-S., dated 7th January 1899.</i> —Submits the information asked for in Serial No. 2, suggests that some of the temporary appointments (which it is proposed to create) should be given to the permanent clerks in the Simla Office, who are acquainted with the reduction of meteorological observations, and asks that the services of these clerks in the temporary appointments may be allowed to count as permanent service, whilst the services in the posts they temporarily vacate and which will be filled up by temporary clerks may count as temporary.	...	3	107
	<i>Despatch to Her Majesty's Secretary of State for India, No. 16, dated 23rd February 1899.</i> —Asks for sanction to the scheme proposed in Serial No. 1. Copy forwarded to the Finance Department for information (No. 568-57-4, dated 23rd February 1899).	...	4	109

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	<i>FILE No. 16 of 1899.</i>			
	<i>Fundamental Magnetic Survey of India. Deputation of Captain Fraser to England.</i>			
1	<p><i>Telegram from Her Majesty's Secretary of State for India, dated 2nd May 1899.</i>—"Your Revenue despatch, 30th March last. Deputation, Fraser. Proposed arrangement sanctioned. Should bring home leave and pay certificate."</p> <p>Copy, with copy of the despatch to which it is a reply forwarded to the Surveyor General of India for information and guidance, with reference to his letter No. 677 S., dated 25th February 1899. (No. 1393—16-3, dated 3rd May 1899.)</p> <p>Copy forwarded to the Finance Department for information, in continuation of endorsement No. 1067—16-2, dated 14th April 1899. (No. 1392—16-3, dated 3rd May 1899.)</p>	A Pros., March 1899, Nos. 21 and 22. (File No. 16.)	3	123
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	<i>Re-organization of the Meteorological Department.</i>			
	<i>Despatch from Her Majesty's Secretary of State for India, No. 74 (Rev.), dated 20th April 1899.</i> —Sanctions the arrangements proposed in Despatch No. 16, dated 23rd February 1899.	A Pros., April 1899, Nos. 1 to 4. (File No. 57 of 1898.)	1	125
2 and 3	<p><i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 1596—34-2, dated 18th May 1899.</i>—Forwards a copy of the above despatch and of the despatch to which it is a reply, and states that the Secretary of State's sanction to the scheme will take effect from the date of its receipt by the Government of India. Approves the revised proposals regarding the Jubbulpore, Khandwa, Poona, Cocanada and Jeypore observatories, and states that the proposal to give some of the temporary posts recently sanctioned to clerks in his Simla Office is covered by Article 410 of the Civil Service Regulations.</p> <p>Copy, with a copy of certain other papers, forwarded to the Finance Department for information (No. 1597—34-2, dated 18th May 1899).</p>	...	2	127

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Part A.] DEPARTMENT OF REVENUE AND AGRICULTURE, MAY, 1899.

METEOROLOGY—continued.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.	Page in A Pro- ceedings.
	<i>FILE No. 37 of 1899.</i>			
	<i>Appointment of Mr. W. A. Bion, Astronomer, Jugga Row Observatory, to the post of First Assistant to the Meteorological Reporter to the Government of India, and Director General of Indian Observatories.</i>			
4 and 5	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 393 S., dated 19th May 1899.—Requests sanction to the appointment of Mr. W. A. Bion, Astronomer, Jugga Row Observatory, to the post of First Assistant to the Meteorological Reporter to the Government of India and Director General of Indian Observatories.</i>	A Pros., May 1899, Nos. 2 and 3. (File No. 34.)	1	129
	<i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 1719—37-2, dated 27th May 1899.—Sanctions the appointment of Mr. Bion to the post of First Assistant to the Meteorological Reporter to the Government of India and Director General of Indian Observatories on a pay of Rs400 rising to Rs500 per mensem by annual increments of Rs20.</i> Copy of correspondence forwarded to the Home Department for information (No. 1720—37-2, dated 27th May 1899). Copy forwarded to the Comptroller, India Treasuries, for information (No. 1721—37-2, dated 27th May 1899).	...	2	129

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JUNE, 1899.

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METEOROLOGY.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.	Page in A Proceed-ings.
	<i>FILE No. 10 of 1899.</i>			
	<i>Improvement in the system of flood and storm warnings.</i>			
1 to 6	<i>From the Public Works Department, No. 749 R. C. dated 26th April 1899.</i> —Forwards a copy of communications from the Engineers-in-Chief of the Hurdwar-Dehra Railway and the Godavari Bridge, and requests that arrangements may be made specially to furnish these officers, and the Superintendent of Works Northern Section, Eastern Bengal State Railway, Kaunia, with storm and flood warnings.	B Pros., April 1899, No. 2. (File No. 10.)	5	131
	<i>From the Government of Madras, Public Works Department, No. 1187 W., dated 3rd May 1899.</i> —In continuation of letter No 552, dated 22nd February 1899, requests that information as to flood warnings may, in future, be addressed to the Agent, South Indian Railway at Trichinopoly, instead of to the Executive Engineer of that Railway at Vellore. Copy forwarded to the Meteorological Reporter to the Government of India for information and guidance (No. 1729—10-527, dated 2nd May 1899).	...	6	132
	<i>From the Public Works Department, No. 825 R. C., dated 6th May 1899.</i> —Forwards a copy of a letter from the Manager, Oudh and Rohilkhand Railway, and requests that he may be furnished with warnings of such storms as would, in the opinion of the Meteorological Reporter, be likely to seriously affect the watershed traversed by the Oudh and Rohilkhand Railway. Copy of Serial Nos. 5 and 7 forwarded to the Meteorological Reporter to the Government of India and Director General of Indian Observatories for information, in continuation of endorsement No. 1246—10-6, dated 12th May 1899 (No. 1729—10-7, dated 29th May 1899).	...	7	132
	<i>From the Public Works Department, No. 910 R. C., dated 23rd May 1899.</i> —Forwards, for information, a copy of a letter from the Director of Railway Construction, to the Manager, Oudh and Rohilkhand Railway, and of endorsements to the Manager, Eastern Bengal State Railway and Godavari Bridge Works, regarding the supply of storm warnings to officers of the Public Works Department. Copy forwarded to the Meteorological Reporter to the Government of India and Director General of Indian Observatories for information, in continuation of endorsement No 1729—10-7, dated 29th May 1899 (No. 1820—10-8, dated 1st June 1899).	...	8	132

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METEOROLOGY—continued.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.	Page in A Proceedings.
	<i>FILE No. 10 of 1899—contd.</i>			
1 to 6 —contd.	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 425 S., dated 31st May 1899.</i> —With reference to the above endorsement asks for instructions regarding the supply of storm warnings to officers of the Public Works Department, and requests that it may be pointed out to that Department that all requests for the supply of storm warnings should be forwarded in a complete form as directed in the Public Works Department Circular No. 643 R. C., dated 9th July 1889.	...	9	133
	<i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 1860—10-10, dated 7th June 1899.</i> —In reply to Serial No. 9, refers him to this Department endorsement, No. 1820—10-8, dated 1st June 1899, regarding the supply of storm warnings to certain officers of the Public Works Department.	...	10	134
	<i>FILE No. 12 of 1899.</i>			
	<i>Inspection of extra Indian Observatories by officers of the Meteorological Department.</i>			
7 and 8	<i>From the Meteorological Reporter to the Government of India, No. 155 S., dated 10th February 1899.</i> —Asks for a general order authorizing the inspection by officers of the Meteorological Department of any observatories outside India maintained by Government or working in direct connection and co-ordination with the India Meteorological Department by officers of that Department on his authority, and for a ruling regarding the travelling allowance to be drawn by the inspecting officers.	...	1	135
	<i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 1845—12-2, dated 3rd June 1899.</i> —In reply, states that the Government of India consider that there are objections to granting a general authority, and requests that when the inspection of any extra Indian Observatories is contemplated separate proposals in each case may be submitted for the sanction of the Government of India showing the probable duration of and the anticipated cost of the tour. Copy forwarded to the Finance Department for information (No. 1846—12-2, dated 3rd June 1899).	...	2	135
	<i>FILE No. 16 of 1899.</i>			
	<i>Deputation of Captain Fraser to England in connection with the Magnetic Survey of India and extension of his leave if necessary.</i>			
	<i>Instruments required for the Magnetic Survey of India.</i>			
9 to 14	<i>From the Surveyor General, No. 9S.—S., dated 11th May 1899.</i> —Forwards a copy of a letter from Lieutenant-Colonel Gore, Superintendent, Trigonometrical Surveys, on the subject of Captain Fraser's deputation to England to make arrangements for the conduct of Magnetic Survey of India. Recommends that Captain Fraser be authorised to order six theodolites as described by Colonel Gore, as well as the six sets of magnetic instruments which shall be considered most suitable. States that there would be no object in Captain Fraser's returning long before the instruments can be sent out. Adds that the necessary permission may be obtained from the Royal Society for Captain Fraser to visit Kew.	A Pros., May 1899, No. 1. (File No. 16.) A Pros., Mar. 1899, Nos. 21 and 22, (File No. 16.)	4	137
	<i>To the Surveyor General of India, No. 1705, dated 26th May 1899.</i> —With reference to the above letter, asks for an emergent indent for theodolites required for the Magnetic Survey.	...	5	139

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METEOROLOGY—continued.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.	Page in A Proceedings.
	<i>FILE No. 16 of 1899—contd.</i>			
9 to 14 —contd.	<i>From the Surveyor General of India, No. 1218.—S., dated 29th May 1899.</i> —Submits an emergent indent for six theodolites (The Indent not printed in Proceedings).	...	6	139
	<i>Despatch to Her Majesty's Secretary of State, No. 39, dated 8th June 1899.</i> —Forwards a copy of No. 4 and asks that Captain Fraser may be allowed to arrange for the purchase of the magnetic instruments in communication with the India Office. States that if the instruments which, as is possible, will have to be made to order are not ready in time to admit of work being begun on the 1st October next, there will be no objection to Captain Fraser being granted such extension of leave as may be admissible to him within the period necessary for the completion of the instruments. Requests that permission may be obtained from the Royal Society for Captain Fraser to visit Kew for the purpose of consulting Professor Reicher Copy of correspondence forwarded to the Finance Department for information, in continuation of endorsement No. 1393—16-3, dated 3rd May 1899.	...	7	141
	<i>To Her Majesty's Under-Secretary of State for India, No. 60, dated 8th June 1899.</i> —Forwards an emergent indent (in duplicate for six theodolites, and recommends that the indent may be complied with. States that the need for the instruments is explained in Serial No. 7.	...	8	145
	<i>From the Surveyor General of India, No. 138 S., dated 30th May 1899.</i> —With reference to this Department endorsement No. 1392—16-3, dated 3rd May 1899, forwards a copy of a letter from the Superintendent, Trigonometrical Surveys, reporting that Captain Fraser was relieved of his duties on the afternoon of the 17th May 1899 with a view to his proceeding to England on deputation. Copy forwarded to the Comptroller, India Treasuries, for information (No. 1935—16-9, dated 12th June 1899).	...	9	145
	<i>FILE No. 17 of 1899.</i>			
	<i>Reorganization of Indian Observatories.</i>			
15 to 24	<i>From the Government of Madras, No. 370, dated 23rd March 1899.</i> —Requests that the Government of India will, when giving effect to the transfer of the Astronomical and Solar Physics Observatories in Madras to the Imperial Control, be able to protect the rights of the present employes in the Madras Meteorological Office by permitting them to retain their existing rates of pay until they retire or are promoted, and suggests that the assistant and peon who accompanied Mr. Michie Smith to Kodaikanal in January last may be admitted to the increased pay which they will receive under the new scheme from the date of their arrival at Kodaikanal.	A Pros., March 1899, Nos. 1 to 12. (File No. 9 of 1898.)	1	147
	<i>Telegram from the Government of Madras, dated 2nd April 1899.</i> —Places the services of Mr. E. L. Jones, Professor of Physics, Presidency College, at the disposal of the Government of India for half-time appointment of Superintendent, Madras Observatory and Meteorological Office, and states that Mr. Jones took charge on the 1st April (forenoon). Requests that his appointment may be notified.	...	2	149
	<i>From the Government of Bombay, No. 1541, dated 10th April 1899.</i> —In reply to this office No. 434—9-21, dated 9th February 1899, states that there is no objection to Mr. N. A. Moos retaining a lien on his appointment in the Educational Department until the future position of the Colaba Observatory is finally determined by the Government of India.	...	3	149

Part A.] DEPARTMENT OF REVENUE AND AGRICULTURE, JUNE, 1899.

METEOROLOGY—continued.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.	Page in A Proceedings.
	<i>FILE No. 17 of 1899—contd.</i>			
15 to 24 —contd.	<i>Notification, No. 1236—17-4, dated 20th April 1899.</i> —Notifying the appointment of Mr. R. L. Jones, Professor of Physics, Presidency College, Madras, as Meteorological Reporter to the Government of Madras and Deputy Director of the Madras Observatory, with effect from the forenoon of the 1st April 1899. Copy forwarded to the Government of Madras for information (No. 1237—17-4, dated 20th April 1899). Copy forwarded to the Meteorological Reporter to the Government of India for information (No. 1238—17-4, dated 20th April 1899).	...	4	149
	<i>From the Meteorological Reporter to the Government of India, No. 325 S., dated 25th April 1899.</i> —Submits a report of his visit to the Colaba and Madras Observatories in March last to make necessary arrangements for the transfer of those observatories from Provincial to Imperial Control.	...	5	149
	<i>Notification, No. 1540—17-6, dated 12th May 1899.</i> —Notifying the appointments of Messrs. Elliot, Michie Smith, and Moos as sanctioned under the new scheme for Indian scientific observatories. Copy forwarded to the Meteorological Reporter to the Government of India and Director General of Indian Observatories for information (No. 1541—17-6, dated 12th May 1899). Copy forwarded to the Government of Madras for information (No. 1542—17-6, dated 12th May 1899). Copy forwarded to the Government of Bombay for information (No. 1543—17-6, dated 12th May 1899). Copy forwarded to the Finance Department for information (No. 1544—17-6, dated 12th May 1899).	...	6	150
	<i>Circular to Local Governments and Administrations, No. 20—17-7, dated 30th May 1899.</i> —Intimates the changes made in the titles of Messrs. Elliot, Michie Smith, and Moos. Copy forwarded to the Departments of the Government of India for information (Circular No. 20—17-7, dated 30th May 1899). Copy forwarded to the Subordinate Departments for information (Circular No. 20—17-7, dated 30th May 1899).	...	7	153
	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 2290, dated 26th May 1899.</i> —Forwards memorials from the First and Second Assistants of the Madras Meteorological Office regarding the pay to be drawn by them, and enquires whether they may be allowed to continue on their old pay and if not, whether they may be allowed the maximum pay of these posts as now sanctioned.	...	8	155
	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 421 S., dated 30th May 1899.</i> —Forwards for orders a copy of correspondence from Mr. Michie Smith, Director of the Kodaikanal and Madras Observatories, in which he requests that hill allowances may be granted to the assistant and peon who accompanied him last January to Kodaikanal.	...	9	159
	<i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 2185—17-10, dated 29th June 1899.</i> —In reply to Serial Nos. 8 and 9, states that the First and Second Assistants having drawn for some time the maximum pay of the posts abolished, are entitled to the maximum pay of the corresponding posts sanctioned under the new scheme for Indian scientific observatories, and sanctions the grant to each of them of a personal allowance of Rs 10 and Rs 5 respectively, with effect from the 1st April 1899. Also sanctions the grant to the assistant and peon, who accompanied Mr. Michie Smith to Kodaikanal in January last, of the increased pay which they now receive from the date of their arrival at Kodaikanal.	...	10	161

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METEOROLOGY—concluded.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.	Page in A Pro- ceedings.
15 to 24 —concl'd.	<i>FILE No. 17 of 1899—concl'd.</i>			
	Copy, with copy of Serial Nos. 1, 8 and 9, forwarded to the Finance Department for information (No. 2186—17-10, dated 29th June 1899). Copy forwarded to the Government of Madras for information, with reference to their No. 370, dated 23rd March 1899 (No. 2187—17-10, dated 29th June 1899).			
25	<i>FILE No. 10 of 1899.</i>	A Pros., June 1899, Nos. 1 to 6. (File No. 10.)	11	163
	<i>Improvement in the present system of warnings of storms and floods in India.</i> <i>From the Public Works Department, No. 1147 R. C., dated 16th June 1899.</i> —With reference to the Public Works Department Memorandum, No. 825 R. C., dated 6th May 1899, forwards a copy of a circular directing that applications by the officers of the Public Works Department for warnings of storms and floods should be submitted in accordance with the instructions on the subject contained in that Department Circular No. 643 R. C., dated 9th July 1899. Copy forwarded to the Meteorological Reporter to the Government of India and Director General of Indian Observatories for information, with reference to the correspondence ending with this Department letter No. 1890—10-10, dated 7th June 1899, (No. 2193—10-11, dated 30th June 1899.)			

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JULY, 1899.

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METEOROLOGY.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.	Page in A Proceedings.
	<i>FILE No. 27 of 1899.</i>			
	<i>Additions required to complete the observatory buildings at Kodaikanal.</i>			
1 to 4	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 301 S., dated 19th April 1899.—Forwards a letter from the Director of the Solar Physics Observatory at Kodaikanal in which he states that there will be considerable savings in the original estimate of the cost of buildings for the Kodaikanal Observatory, and suggests that a portion of the savings may be utilized in carrying out certain additions and extensions desirable for the completion of the observatory.</i>	A Proc., Mar. 1899, No. 11. (File No. 27.)	2	165
	<i>To the Government of Madras, No. 1717—27-3, dated 26th May 1899.—Forwards a copy of Serial No. 2, and enquires what the savings on the sanctioned estimate for the observatory buildings amount to.</i>	...	3	167
	<i>From the Government of Madras, Public Works Department, No. 1663 W., dated 26th June 1899.—States that the savings on the sanctioned estimates for the Kodaikanal Observatory buildings are estimated at Rs13,500 exclusive of the cost of certain articles which were not included in the original estimates, but which have been provided and paid for under the sanction of the Government of India, Public Works Department.</i>	...	4	167
	<i>Serial Nos. 2, 3 and 4 forwarded to the Public Works Department, with the request that the necessary orders may be issued at a very early date. (No. 2331—27-4, dated 11th July 1899.)</i>			
	<i>From the Public Works Department, No. 713 C. W.—B., dated 13th July 1899.—Forwards a copy of a letter to the Government of Madras, Public Works Department, No. 712 C. W.—H., dated 13th July 1899, sanctioning certain additional works required to complete the observatory buildings at Kodaikanal.</i>	...	5	168
	<i>Copy forwarded to the Meteorological Reporter to the Government of India and Director General of Indian Observatories for information with reference to his letter No. 301 S., dated 19th April 1899.</i>			

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AUGUST, 1899.

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METEOROLOGY.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.	Page in A Proceedings.
	FILE No. 22 OF 1899.			
	<i>Lease of the house No. 4, Camac Street, for the accommodation of the Bengal Meteorological Office.</i>			
1 and 2	From the Government of Bengal, No. 2484 (Agri.), dated 28th July 1899.—In continuation of its letter No. 680 T. R., dated 26th June 1899, states that the house No. 4, Camac Street, has been taken for the Bengal Meteorological Office, and recommends that the terms of the lease may be approved by the Government of Bengal. Adds that Mr. Little is responsible during the period of the lease for any rent in excess of Rs300 per mensem.	B Pros., July 1899, No. 4. (File No. 22.)	5	169
	To the Government of Bengal, No. 2902, dated 25th August 1899.—States that the Government of India have no objection to the proposal of the Government of Bengal to locate the Bengal Meteorological Reporter and his office in the house No. 4, Camac Street, rented at Rs100 per mensem for a period of not less than five years from 1st October 1899, and communicates remarks regarding the rent to be paid by the Bengal Meteorological Reporter for occupying a portion of the house.	...	6	169
	Copy of the correspondence forwarded to the Finance Department and to the Meteorological Reporter to the Government of India and Director General of Indian Observatories for information. (Nos. 2903—2904, dated 25th August 1899.)			

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Matters of Importance—Papers printed.

METEOROLOGY.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.	Page in A Proceed-ings.
	FILE No. 56 of 1898. <i>Establishment of an observatory at Vellore.</i>			
1 to 4	From the Meteorological Reporter to the Government of India, No. 568 S., dated 1st October 1898.—Forwards a copy of the Proceedings of the Board of Revenue, Madras, No. 4043 Mis., dated 4th July 1898, regarding the establishment of an observatory at Vellore, and states that it would be advisable to sanction the establishment of the observatory under the conditions proposed by the Board.	...	1	171
	Enclosures of above— Proceedings of the Board of Revenue, No. 4043 Mis., dated 4th July 1898. The plans of the proposed observatory.—(<i>Not printed in Proceedings.</i>)			
	To the Government of Madras, No. 1624—56-2, dated 20th May 1899.—Forwards a copy of Serial No. 1, and enquires whether the Government of Madras accept the Board's proposals.	...	2	176
	From the Government of Madras, No. 529, dated 18th August 1899.—Accepts the proposals of the Board of Revenue regarding the establishment of an observatory at Vellore. States that the shed for the observatory will be erected at the cost of Provincial funds, and that an annual contribution will be made to the Meteorological Department on account of the allowances to be paid to the observer. Requests that the daily weather telegrams from Vellore to Madras and the instruments required for the observatory may be supplied free of charge.	...	3	175
	To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 2982, dated 1st September 1899.—Sanctions the establishment of an observatory at Vellore, and requests that a complete set of meteorological instruments required for the observatory may be supplied free of	...	4	177

METEOROLOGY—continued.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.	Page in A Proceedings.
1 to 4 —cont.	<p>FILE No. 56 of 1898—continued.</p> <p>charge. Explains how the charges connected with the observatory should be met.</p> <p>Copy forwarded to the Government of Madras for information (No. 2983, dated 1st September 1899).</p> <p>Copy of Serial Nos. 1 to 4 forwarded to the Finance Department for information (No. 2984, dated 1st September 1899).</p>			
	<p>FILE No. 66 of 1898.</p> <p><i>Adoption of a standard time for all India.</i></p>			
5 to 8	<p>Despatch from Her Majesty's Secretary of State for India, No. 204, dated 10th November 1898.—Forwards, for consideration, a proposal from the Royal Scottish Geographical Society that a standard time of five hours in advance of Greenwich time should be established in all India. States that the Royal Geographical Society of London agree in advocating the adoption of a standard time for all India, but that they consider that 5½ hours before Greenwich time would be more generally suitable than five hours.</p> <p>Enclosures of above—</p> <p>Letter from the Royal Scottish Geographical Society, dated 7th June 1898, and enclosures.</p> <p>Letter from the Royal Geographical Society, dated 22nd October 1898, and enclosures.</p> <p>From the Honorary Secretary, Asiatic Society of Bengal, No. O.-477, dated 22nd May 1899.—Communicates the views of the Society regarding the feasibility and desirability of the introduction of a standard time for universal use throughout India. Forwards a copy of the Proceedings of the Society held on 5th April 1899 containing the text of Mr. Oldham's note and of the Resolution adopted by the Meeting.</p> <p>Enclosures of above—</p> <p>Mr. R. D. Oldham's note on time in India and the Resolution adopted by the Meetings.</p> <p>Despatch to Her Majesty's Secretary of State for India, No. 52, dated 10th August 1899.—Communicates remarks on the proposals of the Royal Scottish Geographical Society and the Royal Geographical Society of London, and states that the time has not yet arrived for action such as that suggested by the Societies.</p> <p>Copy of Serial Nos. 1 and 3 forwarded to the Public Works and Military Departments, Surveyor General of India, and Meteorological Reporter to the Government of India and Director General of Indian Observatories for information (Nos. 2703-2706, dated 10th August 1899).</p> <p>To the Honorary Secretary, Asiatic Society of Bengal, No. 2987, dated 1st September 1899.—States that after a very careful consideration of the recommendation made by the Society the Government of India have come to the conclusion that the time has not yet arrived for action such as that suggested by the Society.</p>	<p>Survey B Pros., Jan. 1892, Nos. 13 and 14. (File No. 135.)</p> <p>...</p> <p>...</p> <p>...</p>	<p>1</p> <p>2</p> <p>3</p> <p>4</p>	<p>179</p> <p>185</p> <p>193</p> <p>197</p>
9 to 11	<p>FILE No. 60 of 1899.</p> <p><i>Renewal for two years from 1st January 1900 of the lease of "Constantia."</i></p> <p><i>Proposed purchase of "Constantia."</i></p> <p>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 663 S., dated 18th August 1899.—States that the</p>	<p>A Pros., Sept. 1895, Nos. 1 and 2. (File No. 55.)</p>	1	199

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METEOROLOGY—concluded.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.	Page in A Proceedings.
9 to 11 —contd.	FILE No. 60 OF 1899—continued.			
	lease of "Constantia" which is occupied by the Simla Meteorological Office expires at the end of the present year, and enquires whether the Government of India wish to renew the lease for another period of two years, and if not, what arrangements they wish to make for the accommodation of the office.			
	To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 3031, dated 7th September 1899.—Sanctions the renewal of the lease of the house "Constantia" for a further period of two years from 1st January 1900 on the same rent and conditions as at present. Accepts the proposal to add another room to the house to accommodate the greater part of the increased establishment on the terms proposed.	...	2	199
	Copy forwarded to the Finance Department for information (No. 3032, dated 7th September 1899).			
	To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 3469, dated 28th September 1899.—In continuation of Serial No. 2, states that the Government of India are unable to decide at present whether it will be necessary to purchase the house "Constantia."	...	3	200

GOVERNMENT OF INDIA.

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Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.	Page in A Proceed- ings.
	FILE No. 69 OF 1899.			
	<i>Report on the Administration of the Meteorological Department in 1898-99.</i>			
1 to 3	From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 3800, dated 23rd September 1899. Forwards four copies of the Report on the Administration of the Meteorological Department in 1898-99.	A Pros., Dec. 1898, Nos. 1 to 4. (File No. 60.)	1	201
	Enclosure of above.—(Not printed in Proceedings.)			
	Resolution No. 3735, dated 24th October 1899, reviewing the Report.	"	2	201
	To Her Majesty's Under-Secretary of State for India, No. 165, dated 9th November 1899. Forwards a copy of Serial No. 2.	...	3	205

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METEOROLOGY.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.	Page in A Proceed-ings.
	FILE No. 77 OF 1899.			
	<i>Grant of additional allowances to certain assistants in the Alipore Observatory for working the Time-ball at the Kidderpore Docks.</i>			
1 and 2	From the Meteorological Reporter to the Government of India, and Director General of Indian Observatories, No. 4218, dated 22nd November 1899.—Requests sanction to the grant of additional allowances to certain assistants in the Alipore Observatory for dropping the Time-ball at the Kidderpore Docks belonging to the Port Commissioners.	A Pros., April 1887, Nos. 3 and 4, (File No. 28.)	1	209
	To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 4339, dated 12th December 1899.—Sanctions the grant of additional allowances to the staff of the Alipore Observatory and the entertainment of a peon for dropping the Time-ball at the Kidderpore Docks, and communicates instructions regarding the adjustment of the charge in the accounts.	...	2	210
	Copy of the correspondence forwarded to the Finance Department for information, No. 4340, dated 12th December 1899.			
	FILE No. 16 OF 1899.			
	<i>Title of Captain Fraser to "acting allowance" while on deputation in England in connection with the magnetic survey.</i>			
3 to 9	Despatch from Her Majesty's Secretary of State for India, No. 229, dated 26th October 1899.—Enquires whether Captain H. A. D Fraser should be granted, while on deputation in England, two-thirds of the acting allowance which he was drawing as Deputy Superintendent, 1st grade, in the Survey of India.	B Pros., Aug. 1899, Nos. 11 to 16. (File No. 16.) A Pros., June 1899, Nos. 9 to 14, File No. 16 Met. A Pros., May 1899, No. 1, File No. 16 Met.	16	211
	Telegram from Her Majesty's Secretary of State for India, dated 21st November 1899.—"What are your		17	211

PROCEEDINGS OF THE
Part A.] DEPARTMENT OF REVENUE AND AGRICULTURE, DECEMBER, 1899.

METEOROLOGY—continued.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.	Page in A Proceedings.
3 to 9 —contd.	FILE No. 16 of 1899—continued.			
	wishes respecting last part of my telegram in the Revenue and Agricultural Department, dated 25th July last. Captain Fraser had two months on special duty; wants two more. I propose to allow if you have no objection subject to his return by October 1900."	A Pros., Mar. 1899, Nos. 21 and 22. File No. 16 Met. C Pros., Dec. 1899, Nos. 1 and 2. File No. 16 Met.		
	To the Surveyor General of India, No. 4093, dated 23rd November 1899.—Forwards a copy of the above telegram and enquires whether he has any objection to Captain Fraser being placed on special duty for two months more.	...	18	211
	From the Surveyor General of India, No. 3364 S., dated 30th November 1899. — States that he has no objection to the proposal made in Serial No. 18.	...	19	211
	Telegram to the Secretary of State for India, dated 8th December 1899.—"Your telegram of 21st November last. No objection to placing Captain Fraser on special duty for two months more on the condition proposed."	...	20	212
	To the Under-Secretary of State for India, No. 187, dated 14th December 1899.—Forwards a copy of the above telegram.	...	21	213
	Despatch to Her Majesty's Secretary of State for India, No. 65, dated 21st December 1899.—States that the acting allowance should be included in the emoluments on which Captain Fraser's duty pay is to be calculated, and indicates the aggregate salary on which his duty pay should be calculated.	...	22	213
	Copy forwarded (No. 4550, dated 30th December 1899) to the Finance Department for information.			
	FILE No. 55 of 1899.			
	<i>Establishment of an observatory at Ootacamund with a branch observatory on the top of the Dodabetta Peak.</i>			
10 and 11	From the Government of Madras, No. 511, dated the 2nd August 1899.—Recommends the establishment of an observatory at Ootacamund with a branch observatory on the top of the Dodabetta Peak.	A Pros., Sept. 1899, Nos. 1 to 4. (File No. 56.) A Pros., Aug. 1899, Nos. 1 and 2. (File No. 22.)	1	215
	To the Government of Madras, No. 4411, dated the 18th December 1899.—Sanctions the proposal made in Serial No. 1, provided the cost of erecting the necessary buildings are defrayed from Provincial revenues. States that the establishment and other recurring annual charges for the observatory will be met from the Meteorological Department (Imperial revenues).	A Pros., Aug. 1897, No. 2. (File No. 168.) A Pros., July 1896, No. 7. (File No. 24.) A Pros., Mar. 1895, No. 1. (File No. 70 of 1894.) B Pros., July 1896, No. 18. (File No. 50.) B Pros., Dec. 1885, Nos. 9 to 11. (File No. 5 A.)	2	215
	Copy, with a copy of Serial No. 1, forwarded to the Meteorological Reporter to the Government of India and Director General of Indian Observatories for information and guidance with a request that the Government of India may be furnished with a proposition statement and a reappropriation statement showing how the extra expenditure chargeable to Imperial revenues during the current year will be met (No. 4412, dated the 18th December 1899).			
	Copy of Serial No. 2 forwarded to the Finance Department for information, with the remark that a proposition statement and a reappropriation statement showing how the extra expenditure during the current year will be met, will be forwarded on receipt from the Meteorological Reporter to the Government of India and Director General of Indian Observatories (No. 44-13, dated the 18th December 1899).			

ABSTRACT TABULAR STATEMENT, PART B

OF

PROCEEDINGS

OF

THE DEPARTMENT OF REVENUE AND AGRICULTURE

FOR

JANUARY, 1899.

Matters of Routine—Papers not printed.

METEOROLOGY.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
	<i>FILE No. 3 of 1898.</i>		
	<i>Report on the total Solar Eclipse of the 22nd January 1898.</i>		
1 and 2	<i>From the Surveyor General of India, No. 3721 S., dated 21st December 1898.</i> —In reply to this office letter No. 3443—3-15, dated the 17th December 1898, forwards two copies of the above Report, and states that, if necessary, more will be sent. Adds that the Survey Officers concerned deserve commendations for the successful way in which they managed the large camps for the English Astronomers at those places.	C Pros., Dec. 1898, Nos. 6 to 8.	16
	<i>To the Surveyor General of India, No. 29—3-17, dated 4th January 1899.</i> —Acknowledges the receipt of Serial No. 16, and expresses satisfaction of the Government of India at the success of the observations and the efficient arrangements made for the reception of the English Astronomical Parties. Agrees with him in his commendations of the officers concerned. Asks for three more copies of the Report.	...	17
	<i>FILE No. 3 of 1899.</i>		
	<i>Distribution list of Meteorological publications for 1899.</i>		
3 and 4	<i>From the Meteorological Reporter to the Government of India, No. 98, dated 11th January 1899.</i> —Submits in triplicate a complete distribution list of the publications of the Meteorological Department for 1899.	B Pros., Jan. 1898, Nos. 9 and 10. (File No. 4.)	1
	<i>To Her Majesty's Under-Secretary of State for India, No. 3, dated 19th January 1899.</i> —Forwards the list (in duplicate) referred to in Serial No. 1.	...	2
	<i>FILE No. 61 of 1898.</i>		
	<i>Observations of sunspots at Poona.</i>		
5 to 7	<i>From the Secretary of State, to the Government of Bombay, No. 23 (Rev.), dated 20th October 1898.</i> —Forwards copy of a letter from the Secretary of the Solar Physics Committee of the Science and Art Department with reference to observations of sunspots at Poona.	A Pros., Sept. 1897, Nos. 4 to 9. (File No. 58 of 1896.)	1
	<i>To the Government of Bombay, No. 3228—61-2, dated 19th November 1898.</i> —Asks for a copy of the enclosure to the above despatch from the Secretary of State for India.	...	2
	<i>From the Government of Bombay, No. 1539, dated 28th November 1898.</i> —Forwards a copy of the papers asked for in Serial No. 2.	...	3
	No orders.		

ABSTRACT TABULAR STATEMENT, PART B

OF

PROCEEDINGS

OF

THE DEPARTMENT OF REVENUE AND AGRICULTURE

FOR

FEBRUARY, 1899.

Matters of Routine—Papers not printed.

METEOROLOGY.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
	<i>FILE No. 1 of 1899.</i>		
	<i>Supply of Daily Weather Press telegrams to the "Kathiawar Times."</i>		
1 to 4	<i>From the Meteorological Reporter to the Government of India, No. 20 S., dated 6th January 1899.</i> —Submits for orders an application from the Editor, <i>Kathiawar Times</i> , for the supply of the Daily Weather Press telegrams to that paper, and states that the cost of the telegrams will be from Rs 5 to 6 daily, and that if the application is sanctioned, the telegraphic expenditure will be increased by about Rs 2,000 annually.	B Pros., May 1897, Nos. 1 and 2. (File No. 30.)	[1
	<i>To the Government of Bombay, No. 244—1-2, dated 19th January 1899.</i> —Forwards the letter from the Editor of the <i>Kathiawar Times</i> , and enquires whether, in the opinion of the Governor in Council, the concession asked for should be granted.	...	2
	<i>From the Government of Bombay, No. 623, dated 9th February 1899.</i> —In reply to Serial No. 1, states that there is no objection to comply with the request of the Editor of the <i>Kathiawar Times</i>.	...	3
	<i>To the Meteorological Reporter to the Government of India, No. 539—1-4, dated 22nd February 1899.</i> —With reference to Serial No. 1, states that the request of the Editor, <i>Kathiawar Times</i> , cannot be complied with.	...	4
	<i>FILE No. 14 of 1899.</i>		
	<i>Transfer of the Thermometer shed of the Madras Meteorological Office to the charge of the Madras Public Works Department.</i>		
5	<i>From the Public Works Department, No. 130 C. W.—B., dated 9th February 1899.</i> —Forwards a copy of a letter to the Government of Madras, sanctioning the transfer of the Thermometer shed of the Madras Meteorological Office to the charge of the Madras Public Works Department and communicating remarks regarding the increase in the Provincial assignment. Copy forwarded to Meteorological Reporter to the Government of India for information, in continuation of endorsement No. 1821—24-2, dated 1st August 1896 (No. 556—14-1, dated 22nd February 1899).	B Pros., Mar. 1897, No. 1. (File No. 5 of 1897.) A Pros., Aug. 1896, No. 1. (File No. 24.) A Pros., July 1896, No. 7. (File No. 24.)	1

GOVERNMENT OF INDIA.

ABSTRACT TABULAR STATEMENT, PART B
OF
PROCEEDINGS
OF
THE DEPARTMENT OF REVENUE AND AGRICULTURE
FOR
MARCH, 1899.

Matters of Routine—Papers not printed.

METEOROLOGY.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
	<i>FILE No. 8 of 1899.</i> <i>Photographs of the eclipse of the sun in January 1898.</i>		
1	<i>From the Government of Madras, No. 221, dated 22nd February 1899.</i> —With reference to the previous correspondence reports that copies of the photographs have already been forwarded to the Government of India and to the Meteorological Reporter to the Government of India by the Government Astronomer, Madras. No orders.	B Pros., Nov. 1898, (Nos. 5 and 6. File No. 33) B Pros., Sept. 1898, Nos. 24 and 25. (File No. 33.)	1
	<i>FILE No. 19 of 1899.</i> <i>Report on the inspection of rain-gauges in the Bombay Presidency for 1898.</i>		
2	<i>From the Government of Bombay, No. 931, dated 1st March 1899.</i> —Forwards a copy of a letter from the Survey Commissioner and the Director of Land Records and Agriculture, No. 4—392, dated 9th February 1899, on the subject of the annual inspection of rain-gauges in the Bombay Presidency during the calendar year 1898. Adds that the Political Officers concerned will be instructed to see that measures are taken as far as possible for the inspection of rain-gauges in Native States. Forwarded to the Meteorological Reporter to the Government of India for information, in continuation of endorsement No. 1132—28-1, dated 3rd May 1898 (No. 881—19-1, dated 9th March 1899).	B Pros., May 1898, No 2. (File No. 28.)	2
	<i>FILE No. 20 of 1899.</i> <i>Indent for Bromide paper for the Meteorological Department.</i>		
3 and 4	<i>From the Meteorological Reporter to the Government of India, No. 863, dated 8th March 1899.</i> —Submits in triplicate an emergent indent for Bromide paper for use with the Milne's Seismometers during the year 1899-1900 at the Alipore, Madras and Colaba Observatories, and requests that the indent may be forwarded to the India Office for compliance. <i>To Her Majesty's Assistant Under-Secretary of State for India, No. 26—20-2, dated 9th March 1899.</i> —Requests that the Director General of Stores may be instructed to forward to the Meteorological Office, Calcutta, a supply of Bromide paper for use with Milne's Seismograph.	B Pros., Oct. 1898, Nos. 4 to 7. (File No. 37.) ...	1 2

PROCEEDINGS OF THE

Part B.] DEPARTMENT OF REVENUE AND AGRICULTURE, MARCH, 1899.

METEOROLOGY—continued.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
	FILE No. 10 of 1899.		
	<i>Improvement in the present system of warnings for storms and floods in India.</i>		
5 to 7	<i>From the Government of the Punjab, No. 109, dated 6th February 1899.</i> —With reference to this Office Circular No. 26—35-3, dated 9th November 1898, requests that the Executive Engineers of the Hazara, Dera Ismail Khan and Dera Ghazi Khan Provincial Divisions may be included in the list of officers to whom storm or flood warning should be issued in future.	B Pros., Dec. 1898, Nos. 6 and 7. (File No. 35.) A Pros., Nov. 1898, Nos. 3 to 5. (File No. 35.)	1
	<i>From the Government of Madras, No. 552, dated 22nd February 1899.</i> —With reference to this Department Circular No. 26—35-3, dated 9th November 1898, on the subject of warnings for storms and floods in India forwards a copy of Proceedings No. 346 W., dated 4th February 1899, showing the action taken by the Government of Madras in the matter. Copy forwarded to the Meteorological Reporter to the Government of India for information (No. 935—10-2, dated 16th March 1899).	...	2
	<i>To the Government of the Punjab, No. 933—10-3, dated 16th March 1899.</i> —With reference to Serial No. 1, states that the Meteorological Reporter to the Government of India will be asked to meet the wishes of the Punjab Government as far as possible, and requests that he may be furnished with certain information to enable him to give effective warnings. Copy of Serial Nos. 1 and 3 forwarded to the Meteorological Reporter to the Government of India for information (No. 934—10-3, dated 16th March 1899).	...	3
	FILE No. 18 of 1899.		
	<i>Jugga Rao Observatory suit.</i>		
8 to 10	<i>Telegram from the Government of Madras, dated 2nd March 1898.</i> —With reference to the correspondence ending with this office telegram No. 2168, dated 12th August 1898, reports that Mrs. Nursing Rao has since died and that money deposited by her has been expended. Asks for instructions regarding the payment of the balance of Counsel's fees already due and likely to be incurred in defending the suit brought to cancel the deed of trust, adds that the case is postponed for the thirteenth instant.	B Pros., Sept. 1898, Nos. 26 to 28. (File No. 24.)	1
	<i>Telegram to the Government of Madras, No. 857—18-2, dated 8th March 1899.</i> —Asks that the Committee of the Jugga Rao Observatory may be moved to provide funds from their cash balance to defray expenses in defending the suit.	...	2
	<i>Telegram to the Government of Madras, No. 920—18-3, dated 13th March 1899.</i> —Asks that the funds necessary for the defence of the suit should be advanced if there is any delay in obtaining them from the Observatory Committee. Copy of Serial Nos. 1 to 3 forwarded to the Finance Department for information. (No. 921—18-3, dated 13th March 1899).	...	3
	FILE No. 27 of 1899.		
	<i>Building and furniture for the Observatory at Kodaikanal.</i>		
11	<i>From the Public Works Department, No. 208 C.—W. B., dated 9th March 1899.</i> —Forwards a copy of telegram to the Madras Government, No. 027 C. W.—B., dated 24th February 1899, sanctioning proposed expenditure on fencing and gates for the Government Astronomer's residence at Kodaikanal and for furniture required for professional visitors to the observatory, together with a copy of the letter replied to.	B Pros., Oct. 1896, No. 1. (File No. 61.)	1
	No orders.		

ABSTRACT TABULAR STATEMENT, PART B
OF
PROCEEDINGS
OF
THE DEPARTMENT OF REVENUE AND AGRICULTURE
FOR
APRIL, 1899.

Matters of Routine—Papers not printed

METEOROLOGY.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
	<i>FILE No. 25 of 1899.</i> <i>Annual report on the rainfall registration in Berar for 1898.</i>		
1	<i>From the Resident at Hyderabad, No. 84, dated 20th March 1899.</i> —Forwards a copy of the above. Copy forwarded to the Meteorological Reporter to the Government of India for information, in continuation of endorsement No. 760—25-1, dated 12th March 1898 (No. 1097—25-1, dated 8th April 1899).	B Pros., Mar. 1898, No. 2. (File No. 2.)	1 .
	<i>FILE No. 10 of 1899.</i> <i>Improvement in the present system of warnings of storms and floods in India.</i>		
2	<i>From the Public Works Department, Circular No. 1 (Railway), dated 16th March 1899.</i> —Forwards a copy of a Circular to Local Governments, Consulting Engineers to the Government of India for Railways, Managers of Railways, etc., requesting that every officer to whom the storm warnings are sent may be directed to maintain a register in which the necessary particulars relating to each warning should be entered as soon as possible after the receipt of the warning, together with further particulars as to its prompt delivery and its correctness or otherwise as suggested by this Department. Copy forwarded to the Meteorological Reporter to the Government of India for information, in continuation of endorsement No. 935—10 2, dated 16th March 1896 (No. 1036—10-4, dated 8th April 1899).	B Pros., Mar. 1899, Nos. 5 to 7. (File No. 10.)	4
	<i>FILE No. 22 of 1899.</i> <i>Accommodation for the Bengal Meteorological Office.</i>		
3	<i>From the Government of Bengal, No. 1071, dated 14th March 1899.</i> —With reference to this office No 2629—55-13, dated 29th September 1898, states that the Government of Bengal will not be in a position to make any definite arrangement for the future accommodation of the Bengal Meteorological Office till August.	A Pros., Nov. 1898, Nos. and 2. (File No. 59.)	1
	No orders.		

PROCEEDINGS OF THE

Part B.] DEPARTMENT OF REVENUE AND AGRICULTURE, APRIL, 1899.

METEOROLOGY—continued.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
	<i>FILE No. 23 of 1899.</i>		
	<i>Differences of local time and Greenwich mean time in various parts of the world.</i>		
4 to 7	<i>Despatch from Her Majesty's Secretary of State, No. 14, dated 9th March 1899.</i> —With reference to his Despatch No. 32 (Records), dated 4th November 1897, forwards, for distribution, seventy copies of a paper published by Professor Milne embodying the results of his enquiries regarding the differences of local time and Greenwich mean time in various parts of the world.	A Pros., Feb. 1898, Nos. 1 to 5. (File No. 70 of 1897.)	1
	<i>Circular to the Local Governments and Administrations, No. 16—23-2, dated 20th April 1899.</i> —Forwards, for information, a copy of Professor Milne's paper referred to in Serial No. 1. Copy, with a copy of Professor Milne's paper, forwarded to the Meteorological Reporter to the Government of India for information (Circular No. 16—23-2, dated 20th April 1899).	..	2
	<i>To the Surveyor General of India, No. 1233—23-3, dated 20th April 1899.</i> —Forwards a copy of Professor Milne's paper referred to in Serial No. 1.	..	3
	<i>To the Foreign and Public Works Departments, Nos. 1234-1235—23-4, dated 20th April 1899.</i> —Forwards a copy of Professor Milne's paper referred to in Serial No. 1.	...	4
		..	5
	<i>FILE No. 28 of 1899.</i>		
	<i>Temporary Establishment for the Office of the Meteorological Reporter to the Government of the North-Western Provinces and Oudh.</i>		
8 and 9	<i>From the Meteorological Reporter to the Government of India, No. 271 S., dated 17th April 1899.</i> —Asks for sanction to the entertainment for one year of a temporary establishment in the Office of the Meteorological Reporter to the Government of the North-Western Provinces and Oudh, and states that the cost will be met from savings in the grant for "storm observations and special investigations" for 1899-1900.	B Pros., Dec. 1898, Nos. 2 and 3. (File No. 65.)	1
.	<i>To the Meteorological Reporter to the Government of India, No. 1209—28-2, dated 19th April 1899.</i> —In reply to Serial No. 1, sanctions the temporary establishment, and states that the cost will be met by reappropriation from the grant in the budget of the Meteorological Department for 1899-1900 for "special storm observations and investigations." Copy, with copy of the reappropriation statement, forwarded to the Comptroller of India Treasuries for information (No. 1210—28-2, dated 19th April 1899).	...	2
	<i>FILE No. 20 of 1899.</i>		
	<i>Indent for chronometers for the Colaba Observatory.</i>		
10 and 11	<i>From the Meteorological Reporter to the Government of India, No. 1853, dated 18th April 1899.</i> —Submits in triplicate an emergent indent for chronometers for the chronometer store of the Government Observatory, Colaba, Bombay, for 1899-1900, and requests that the indent may be forwarded to the India Office for early compliance.	B Pros., Mar. 1899, Nos. 3 and 4. (File No. 20.)	3
	<i>To Her Majesty's Under-Secretary of State for India, No. 43—20-4, dated 27th April 1899.</i> —Forwards an emergent indent (in duplicate) for chronometers for the Colaba Observatory for 1899-1900 together with a copy of Serial No. 3, and recommends that the indent may be complied with at a very early date.	...	4

ABSTRACT TABULAR STATEMENT, PART B

OF

PROCEEDINGS

OF

THE DEPARTMENT OF REVENUE AND AGRICULTURE

FOR

MAY, 1899.

Matters of Routine—Papers not printed.

METEOROLOGY.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
	<i>FILE No. 30 of 1899.</i>		
	<i>Return of the Rainfall of India during the year 1898.</i>		
1 and 2	<i>From the Meteorological Reporter to the Government of India, No. 1891, dated 20th April 1899.</i> —Submits a condensed tabular return of the rainfall of India during the year 1898 for the information of the Secretary of State, together with two charts shewing the general distribution of the total rainfall of the year and those provinces in which the rainfall was respectively either normal or in excess or in defect, and a memorandum on the more noteworthy features of the rainfall distribution.	B Pros., April 1898, Nos. 1 and 2. (File No. 26 of 1898.) B Pros., Sept. 1898, Nos. 4 and 13. (File No. 26.)	1
	<i>To Her Majesty's Under-Secretary of State for India, No. 45, dated 4th May 1899.</i> —Forwards, for the information of the Secretary of State, copy of memorandum, return, and charts relating to the rainfall of India during 1898.	...	2
	<i>FILE No. 20 of 1899.</i>		
	<i>Indent of Stores for the Meteorological Department for 1899-1900.</i>		
3	<i>From the Finance Department, No. 1770 S. R., dated 25th April 1899.</i> —Intimates that the Secretary of State for India has sanctioned the supply of stores for the Calcutta Meteorological Department, referred to in this Department No. 186, dated 27th October 1898, addressed to the India Office. Copy forwarded to the Meteorological Reporter to the Government of India for information, with reference to his letter No. 2972, dated 11th October 1898 (No. 1394—20-5, dated 3rd May 1899).	B Pros., Oct. 1898, Nos. 4 to 7. (File No. 37.)	5
	<i>FILE No. 32 of 1899.</i>		
	<i>Report on the condition and progress of the G. V. Jugga Row Observatory at Vizagapatam for 1897.</i>		
4 and 5	<i>From the Government of Madras, No. 1201, dated 25th April 1899.</i> —Forwards the Annual Report on the condition and progress of G. V. Jugga Row Observatory at Vizagapatam for 1897.	B Pros., Feb. 1898, Nos. 8 to 10. (File No. 12.)	1

PROCEEDINGS OF THE
Part B.] DEPARTMENT OF REVENUE AND AGRICULTURE, MAY, 1899.

METEOROLOGY—continued.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
	<i>FILE No. 32 of 1899—contd.</i>		
4 and 5 —contd.	<i>To the Government of Madras, No. 1505—32-2, dated 10th May 1899.</i> —Acknowledges receipt of the report, and requests that the members of the General Committee may be informed that the Government of India have noticed, with satisfaction the work done at the Observatory.	...	2
	<i>FILE No. 35 of 1899.</i>		
	<i>Increase of pay of the Observer at the Seychelles.</i>		
6 and 7	<i>From the Meteorological Reporter to the Government of India, No. 2062, dated 4th May 1899.</i> —Asks for sanction to the increase of pay of the Observer at the Seychelles from R20 to R30 per mensem.	A Pros., April 1895, Nos. 1 to 4. (File No. 31.)	1
	<i>To the Meteorological Reporter to the Government of India, No. 1480—35-2, dated 9th May 1899.</i> —In reply, sanctions an increase of R10 per mensem to the pay of the Observer at the Seychelles from 14th May 1899 to the end of the current financial year, on the understanding that the expenditure is met from savings in the Budget Grants of his Department for 1899-1900. Points out certain errors in the Proposition and Re-appropriation Statements forwarded with his letter, and asks for a Revised Proposition Statement with a view to making an application to the Finance Department for sanction to a permanent increase to the pay of the Observer at the Seychelles. Extract (paragraphs 1 and 2), with a copy of the re-appropriation statement, forwarded to the Comptroller, India Treasuries, for information (No. 1481—35-2, dated 9th May 1899).	...	2
	<i>FILE No. 31 of 1899.</i>		
	<i>Establishment of a Meteorological Observatory at Hissar.</i>		
8 and 9	<i>From the Inspector General, Civil Veterinary Department, No. 41—51 R. & A., dated 26th April 1899.</i> —Forwards a copy of a letter from the Superintendent, Government Cattle Farm, Hissar, in which he proposes that a meteorological station should be established at that station, and recommends that this may be done.	...	1
	<i>To the Government of the Punjab, No. 1625—31-2, dated 20th May 1899.</i> —Forwards a copy of the above letter, and asks for the opinion of His Honour the Lieutenant-Governor as to the utility of the Observatory to interests other than those of the farm.	...	2
	<i>FILE No. 33 of 1899.</i>		
	<i>Mr. Elson's Weather Signal Code.</i>		
10 and 11	<i>From the Meteorological Reporter to the Government of India, No. 1937, dated 28th April 1899.</i> —Forwards a copy of correspondence regarding Mr. Elson's Weather Signal Code for the use of Captains of vessels in the Bay of Bengal, and asks that the Government of India should sanction the publication of 200 copies of the Code, and decide whether the cost should be met by the Government of India or the Government of Bengal, who should be specially interested in it.	...	1
	<i>To the Government of Bengal, No. 1626—33-2, dated 20th May 1899.</i> —Forwards a copy of above, and enquires whether the Lieutenant-Governor has any objection to the publication of the Code, and if not, whether the Local Government would bear the cost.	...	2
	<i>FILE No. 20 of 1899.</i>		
	<i>Indent for Stores for the Meteorological Department.</i>		
12 to 16	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 2125, dated 10th May 1899.</i> —Submits an emergent indent for instruments required for the use of the Government Observatory, Bombay, during the present year, and requests that the India Office may be asked to expedite the despatch of the articles before the end of the year.	B Pros., May 1899, No. 3. (File No. 20.)	6

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, MAY, 1899. [Part B.

METEOROLOGY—concluded.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
	(FILE No. 20 of 1899—contd.		
12 to 16 —contd.	<p><i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 2187, dated 16th May 1899.</i>—In continuation of letter No. 1853, dated 18th April 1899, enclosing a supplementary indent for chronometers required for the Government Observatory, Bombay, suggests that the chronometers may be shipped direct to the address of the Government Observatory, Bombay.</p> <p><i>From the Director General of Stores, No. S. D. O. 5045, dated 12th May 1899.</i>—With reference to Serial No. 2, states that Mr. Munro, the supplier, would not guarantee the results of the Bromide paper if kept in stock for so long a period as two years, and thinks that a six months' supply is the largest quantity which should be shipped at one time. Proposes to send three separate tins for the present, and to send three further similar instalments at intervals of six months. Enquires if this course will suit the requirements.</p> <p><i>To Her Majesty's Under-Secretary of State for India, No. 58, dated 1st June 1899.</i>—Forwards an emergent indent for instruments required for the use of the Government Observatory, Bombay, during the current year, and recommends that the indent may be complied with. Requests that the chronometers indented for in the supplementary indent sent with this Department letter No. 43, dated 27th April 1899, as well as the articles now indented for may be shipped direct to the address of the Director of the Colaba Observatory, Bombay.</p> <p><i>To the Director General of Stores, No. 59, dated 1st June 1899.</i>—In reply to Serial No. 8, states that his proposal to supply by instalments the Bromide paper indented for for the Meteorological Department is accepted, and requests that one, containing 26 rolls, may be sent at intervals of six months direct to each of the following officials:—(1) Meteorological Reporter to the Government of India and Director General of Indian Observatories, Calcutta, (2) Director of the Kodaikanal and Madras Observatories, Kodaikanal, Madras, and (3) Director of the Colaba Observatory, Bombay.</p> <p style="text-align: center;"><i>FILE No. 39 of 1899.</i></p> <p><i>Bombay Magnetical and Meteorological Observatories for the year 1897.</i></p>	... ... ... ...	7 8 9 10
17 and 18	<p><i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 416 S., dated 27th May 1899.</i>—Forwards 22 copies of the Bombay Magnetical and Meteorological Observatories for the year 1897, and states that one copy is for the Secretariat Library and 21 copies (including the copy for the British Museum) are for the Secretary of State for India.</p> <p><i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 1825—39-2, dated 2nd June 1899.</i>—In reply, states that the publication should be treated in the same way as publications of his own office, that is, that it should be sent by his office to the India Office, an intimation of the despatch being sent to this Department. Returns the 21 copies forwarded for the Secretary of State.</p>	... ...	1 2

GOVERNMENT OF INDIA.

ABSTRACT TABULAR STATEMENT, PART B

OF

PROCEEDINGS

OF

THE DEPARTMENT OF REVENUE AND AGRICULTURE

FOR

JUNE, 1899.

Matters of Routine—Papers not printed.

METEOROLOGY.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
	<i>FILE No. 34 of 1899.</i>		
	<i>Reorganisation of the Meteorological Department.</i>		
1 and 2	<i>From the Comptroller of India Treasuries, No. T. A.—262, dated 10th June 1899.—Asks for a copy of this Department letter No. 1546—34-2, dated 18th May 1899, regarding the reorganisation of the Meteorological Department.</i>	A Pros., May 1899, Nos. 2 and 3. (File No. 34.)	3
	<i>To the Comptroller of India Treasuries, No. 2006—34-4, dated 17th June 1899.—Forwards a copy of the letter and enclosures asked for.</i>	...	4
	<i>FILE No. 26 of 1899.</i>		
	<i>Forecast of the probable character of the South-West Monsoon rains of 1899.</i>		
3	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 464 S., dated 14th June 1899.—Forwards six copies of the Memorandum on the snowfall in the mountain districts bordering Northern India and the abnormal features of the weather in India during the past year, with a forecast of the probable character of the south-west monsoon rains of 1899.</i>	B Pros., Sept. 1898, No. 8. (File No. 38.) B Pros., June 1898, No. 6. (File No. 38.)	2
	No orders.		
	<i>FILE No. 41 of 1899.</i>		
	<i>Extension of service to Babu Hem Chandra Mukherji, a clerk in the Calcutta Meteorological Office.</i>		
4 to 6	<i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 1844—41-1, dated 3rd June 1899.—Intimates that the extension of service for one year granted to Babu Hem Chandra Mukherji, a clerk in the Calcutta Meteorological Office, will expire in August 1899, and asks for a report as to his fitness or otherwise for further service.</i>	B Pros., Sept. 1898, No. 6. (File No. 52.)	1
	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 2458, dated 12th June 1899.—In reply, states that Babu Hem Chandra Mukherji is still efficient in performing his duties and is in good health, and that he has applied for a further extension of service for one year. Asks for sanction to the extension applied for by him.</i>	...	2

PROCEEDINGS OF THE

Part B.] DEPARTMENT OF REVENUE AND AGRICULTURE, JUNE, 1899.

METEOROLOGY—continued.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
	FILE No. 41 of 1899—contd.		
4 to 6 —contd.	<i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 2051—41-3, dated 20th June 1899.</i> —Sanctions the grant to Babu Hem Chandra Mukherji, a further extension of service for one year from the date on which the extension sanctioned in 1897 expires, subject to his continued efficiency. Copy forwarded to the Comptroller, India Treasuries, for information with reference to his Memorandum No. S. D.—1031, dated 30th August 1898 (No. 2052—41-3, dated 20th June 1899).	...	3
	FILE No. 22 of 1899. <i>Accommodation for the Bengal Meteorological Office.</i>		
7 and 8	<i>From the Government of Bengal, No. 349 T., dated 5th June 1899.</i> —With reference to the correspondence ending with that Government's letter No. 1071 (Agri.), dated 14th March 1899, states that the Government of Bengal has not up to date been able to secure quarters in the business quarter of the town which could be regarded as satisfactory from a financial point of view. Accepts the suggestion of the Government of India that for temporary purposes, and pending the making of arrangements for permanent quarters in the business part of the town, one of the new dwelling houses at Alipore should be rented for the office and residence of the Bengal Meteorological Officer.	B Pros., April 1899, No. 3. (File No. 22.)	2
	<i>To the Government of Bengal, No. 2064—22-3, dated 20th June 1899.</i> —Requests that the arrangements for renting a suitable house at Alipore may be carried out at an early date, so that the Bengal Meteorological Office can occupy it from the end of October next, when the lease of No. 5, Russell Street house expires.	...	3
	FILE No. 5 of 1899. <i>Purchase of bicycles for the proper delivery of the daily weather report in Madras.</i>		
9 and 10	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 113, dated 12th January 1899.</i> —Forwards a copy of the correspondence with the Government of Madras and the Meteorological Reporter, Madras, regarding the purchase of bicycles for the proper delivery of the Madras daily weather report, and enquires whether the Government of Madras or the Government of India should pay for any special charges required in connection with the Madras daily weather report, and should it be decided that the Government of India will pay, whether these charges are to be met from the budget grants of the Meteorological Department, which will in that case have to be increased.	A Pros., July 1893, Nos. 1 to 3. B Pros., Sept. 1893, No. 15. A Pros., Aug. 1894, Nos. 1 to 3. A Pros., Aug. 1894, Nos. 4 to 18. B Pros., Jan. 1897, Nos. 1 to 4. (File No. 78 of 1896.)	1
	<i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 2017—5-2, dated 19th June 1899.</i> —In reply, states that as expenditure under the head of Meteorology is Imperial, and as the expenditure on bicycles must be considered an incidental contingent charge to be incurred in the ordinary course of administration of the Madras Office, it must, if it is required, be borne by Imperial revenues. Requests that he will consider the case on its merits, and if he decides that the expenditure is absolutely necessary for the proper delivery of reports in Madras, he will arrange to meet the charge by reappropriation, if possible, or apply for a special grant or for leave to include the necessary sum in his next year's budget.	...	2
	FILE No. 39 of 1899. <i>Bombay Magnetical and Meteorological Observations for 1897.</i>		
11 and 12	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 2650, dated 15th June 1899.</i> —With reference to this Department letter No. 1825—39-2, dated 2nd June 1899, intimates that a package containing 21 copies for the India Office of the Bombay Magnetical and Meteorological Observations for 1897, and presentation copies of the same for distribution in America, to be delivered to Mr. Wesley, Agent of the Smithsonian Institution, Washington, at London, was sent to the India Office through the Agent for Government Consignments, Calcutta, on the 14th June 1899.	B Pros., May 1899, Nos. 17 and 18. (File No. 39.)	3

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, JUNE, 1899. [Part B.

METEOROLOGY—concluded.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
	<i>FILE No. 39 of 1899—contd.</i>		
11 and 12 —contd.	<i>To Her Majesty's Under-Secretary of State for India, No. 68, dated 22nd June 1899.</i> —Advises the despatch of the package referred to in the above letter, and requests that the packet containing presentation copies for distribution in America may be delivered to Mr. William Wesler, Agent of the Smithsonian Institution, Washington, D. C. 28, Essex Street, Strand, London.	...	2
	<i>FILE No. 46 of 1899.</i>		
	<i>Transfer to the Bombay Public Works Department of the grant for "Petty construction" provided in the Budget of the Colaba Observatory for 1899-1900.</i>	A Pros., Mar. 1899, Nos. 13 to 20. (File No. 10 of 1898.)	1
13 and 14	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 2457, dated 12th June 1899.</i> —Forwards a copy of a letter from the Director of the Colaba Observatory asking that the sum of Rs450 provided for "Petty construction" in the current year's budget estimate of that observatory, may be transferred to the Public Works Department, Bombay, and requests that the transfer applied for may be sanctioned.		
	<i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 2087—46-2, dated 22nd June 1899.</i> —With reference to above draws attention to Article 98 (u) of the Civil Account Code, Volume I, which allows of the expenditure against the grant being classified as contingent expenditure of the Office concerned.	...	2
	<i>FILE No. 49 of 1899.</i>		
	<i>Cyclonic signals on the Fort St. George flag-staff.</i>		
15	<i>From the Military (Marine) Department, No. 331, dated 22nd June 1899.</i> —Forwards a copy of the Proceedings of the Government of Madras (Marine Department), directing that the repetition of the cyclone signals on the Fort St. George flag-staff be discontinued and that paragraph I of Chapter II of the Cyclone Code be expunged. Copy forwarded to the Meteorological Reporter to the Government of India and Director General of Indian Observatories for information, in continuation of endorsement No. 114—5-1, dated 13th January 1898 (No. 2158—49-1, dated 27th June 1899).	A Pros., Jan. 1898, No. 44. (File No. 5.)	1
	<i>FILE No. 38 of 1899.</i>		
	<i>Annual Reports of the Colaba and Madras Observatories for 1898-99.</i>		
	<i>Procedure to be followed in the printing of the annual reports of the Madras and Kodaikanal Observatories.</i>		
16 to 18	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 398 S., dated 23rd May 1899.</i> —Forwards 22 copies of the report on the condition and proceedings of the Government Observatory, Colaba, for the year ending 31st March 1899.	B Pros., Sept. 1898, No. 9. (File No. 33.) B Pros., Sept. 1898, Nos 1 to 5. (File No. 33.)	1
	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 479 S., dated 17th June 1899.</i> —Forwards the manuscript report on the working of the Madras Observatory for 1898-99, and requests that orders may be given to print it. Asks for instructions regarding the procedure to be followed in the printing of the annual report of the Madras and Kodaikanal Observatories in future.	...	2
	<i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 2182—38-3, dated 29th June 1899.</i> —In reply, sanctions the printing by the Superintendent, Government Printing, Calcutta, of the report, and states that in future the annual reports of the Madras and Kodaikanal Observatories should be treated in the same way as the reports of your own office. Copy forwarded to the Superintendent, Government Printing, for information (No. 2183—38-3, dated 29th June 1899).	...	3

ABSTRACT TABULAR STATEMENT, PART B

OF

PROCEEDINGS

OF

THE DEPARTMENT OF REVENUE AND AGRICULTURE

FOR

JULY, 1899.

Matters of Routine—Papers not printed.

METEOROLOGY.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
	<i>FILE No. 35 of 1899.</i>		
	<i>Increase of pay of the Observer at the Seychelles.</i>		
1 to 3	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 465 S., dated 14th June 1899.</i> —With reference to this Department letter No. 1480—35-2, dated 9th May 1899, forwards a proposition statement for revision of establishment of the Meteorological Department.	B Pros., May 1899, Nos. 6 and 7. (File No. 35.)	3
	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 469 S., dated 15th June 1899.</i> —In continuation of his letter No. 465—S., dated 14th June 1899, submits a copy of the revised appropriation statement in connection with the proposal to increase the pay of the Observer at the Seychelles from R20 to R30 per mensem.	...	4
	<i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 2297—35-5, dated 10th July 1899.</i> —Sanctions a permanent increase of R10 per mensem to the pay of the Observer at the Seychelles, and states that the extra expenditure during the current financial year should be met by reappropriation. Copy forwarded to the Finance Department for information (No. 2298—35-5, dated 10th July 1899).	...	5
	<i>FILE No. 22 of 1899.</i>		
	<i>Accommodation for the Bengal Meteorological Office. Proposal to rent a house in Theatre Road.</i>		
4	<i>From the Government of Bengal, No. 680 T. R., dated 26th June 1899.</i> —With reference to the correspondence ending with its letter No. 349 T. R., dated 5th June 1899, states that a competent medical authority has condemned the available houses at Alipore as being insanitary, and that the Bengal Meteorological Reporter has been permitted to secure a suitable house in Theatre Road with the proviso that should the rental exceed R300 a month Mr. Little is to be responsible for the excess during the period of the lease.	B Pros., June 1899, Nos. 7 and 8.	4
	No orders.		

PROCEEDINGS OF THE
Part B.] DEPARTMENT OF REVENUE AND AGRICULTURE, JULY, 1899.

METEOROLOGY—continued.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
5 and 6	<i>FILE No. 43 of 1899.</i> <i>Proposal to grant a free passage to England to Miss Pogson, late Meteorological Reporter to the Government of Madras.</i>		
	<i>From the Government of Madras, No. 586, dated 27th May 1899.</i> —Recommends that Miss Pogson, late Meteorological Reporter to the Government of Madras, may be granted a free first class passage to England.	A Pros., Mar. 1899, Nos. 1 to 12. (File No. 9 of 1898.)	1
	<i>To the Government of Madras, No. 2247—43-2, dated 4th July 1899.</i> —Declines to grant to Miss Pogson a free passage to England. Copy of correspondence forwarded to the Finance Department for information (No. 2248—43-2, dated 4th July 1899).	...	2
7 and 8	<i>FILE No. 50 of 1899.</i> <i>Establishment of Meteorological Observatory at Purulia.</i>		
	<i>From the Government of Bengal, No. 596 T. R., dated 21st June 1899.</i> —With reference to this office No. 2605—45-2, dated 24th September 1898, regarding the establishment of a Meteorological Observatory at Purulia, reports that the shed needed for the purposes of the Observatory has been constructed and that arrangements have been made for the appointment of the Observer. Requests sanction to the transmission, free of cost, of weather telegrams during the monsoon season, from Purulia to the Bengal Meteorological office.	A Pros., Sept. 1898, Nos. 2 and 3. (File No. 45.)	1
	<i>To the Government of Bengal, No. 2370—50-2, dated 13th July 1899.</i> —States that charges on account of the cost of weather telegrams sent during the monsoon season from Purulia to the Bengal Meteorological Office may be treated as a charge of the Meteorological Department. Copy, with a copy of Serial No. 1, forwarded to the Meteorological Reporter to the Government of India and Director General of Indian Observatories for information, in continuation of endorsement No. 2606—45-2, dated 24th September 1898. (No. 2371—50-2, dated 13th July 1899.) Copy with a copy of Serial No. 1, forwarded to the Finance Department for information. (No. 2372—50-2, dated 13th July 1899.)	...	2
9 and 10	<i>FILE No. 10 of 1899.</i> <i>Supply of storm and flood warnings to the Manager and Engineer-in-Chief of the Bhavnagar-Gondal-Junagad-Portbandar Railway.</i>		
	<i>From the Government of Bombay (General Department), No. 2793, dated 3rd July 1898.</i> —Requests that the Manager and Engineer-in-Chief, Bhavnagar-Gondal-Junagad-Portbandar Railway, may be supplied with such flood and storm warnings as will be found useful in the working of the Railway.	A Pros., June 1899, No. 25. (File No. 10.)	12
	<i>To the Government of Bombay (General Department), No. 2369—10-13, dated 13th July 1899.</i> —Refers to the Public Works Department Circular No. 1146 R. C., dated 16th June 1899, prescribing the procedure to be followed by officers of the Public Works Department in submitting applications for storm and flood warnings.	...	13
11 and 12	<i>FILE No. 31 of 1899.</i> <i>Establishment of an Observatory at Hissar.</i>		
	<i>From the Government of the Punjab, No. 469 S., dated 14th July 1899.</i> —With reference to this office No. 1625—31-2, dated 20th May 1899, states that as a rain-gauge is already maintained by the Civil Department at Hissar and as there is a fully equipped meteorological station at Sirsa in the same district, the Lieutenant-Governor cannot say that the proposed observatory at Hissar is required in other interests than those of the cattle farm.	B Pros., May 1899, Nos. 8 and 9. (File No. 31.)	3
	<i>To the Inspector General, Civil Veterinary Department, No. 2513, dated 24th July 1899.</i> —With reference to his letter No. 41—51 R. & A., dated 26th April 1899, states that the	...	4

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, JULY, 1899. [Part B.

METEOROLOGY—continued.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
	<i>FILE No. 31 of 1899—contd.</i>		
11 and 12 —contd.	Government of India do not think an observatory at Hissar is required, but that the Meteorological Reporter to the Government of India and Director General of Indian Observatories has been requested to supply the instruments required by the Superintendent, Government Cattle Farm, Hissar, if he can conveniently do so. Copy forwarded to the Meteorological Reporter to the Government of India and Director General of Indian Observatories for information, with the request that the instruments required by the Superintendent, Government Cattle Farm, Hissar, be supplied if this can conveniently be done.		
	<i>FILE No. 42 of 1899.</i>		
	<i>Improvement of the system of flood warnings as regards Godavari river.</i>		
13 and 14	<i>To the Public Works Department, No. 1898—42-1, dated 8th June 1899.</i> —Forwards, for information and record, a copy of a note on the Godavari floods in July and August 1896 by Mr. W. L. Dallas, Assistant Meteorological Reporter to the Government of India.	..	1
	<i>From the Public Works Department, No. 575 C. W.—I, dated 14th June 1899.</i> —Forwards copy of a letter to the Government of Madras, Public Works Department, No. 574 C. W.—I, dated 14th June 1899, together with a copy of the letter to which it is a reply approving the proposal to establish a river gauge for flood warning stations on the Godavari river to furnish the earliest possible telegraphic information of the approach of floods likely to affect the weir or dam at Dowlaishwarain and declining to sanction any proposal for the transfer of the branch of flood warning work from the officers of the Public Works Department to the Meteorological Department as there is at present no staff in that office to carry out the work. Copy, with a copy of the Proceedings of the Government of Madras, No. 247 I., dated 14th March 1899, forwarded to the Meteorological Reporter to the Government of India and Director General of Indian Observatories for information (No. 2512—42-2, dated 24th July 1899).	..	2
	<i>FILE No. 50 of 1899.</i>		
	<i>Transfer of the Purulia and Daltonganj Observatories to Imperial control.</i>		
15	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 569 S., dated 15th July 1899.</i> —Proposes that according to the recent decision of the Government of India that all observatories maintained out of public funds in India should be Imperial, the Purulia and Daltonganj Observatories in Bengal should be transferred to Imperial control. No orders.	B Pros., July 1899, Nos. 7 and 8. (File No. 50.)	3
	<i>FILE No. 51 of 1899.</i>		
	<i>Pay of the Rain Clerk and the Signaller of the Madras Meteorological Office.</i>		
16 and 17	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 2938, dated 11th July 1899.</i> —Points out that the pay of the Rain clerk and the Signaller of the Madras Meteorological Office should be R25-2-35 and R15-2-25, respectively, (and not R32-8-0 and R22-8-0 as proposed in paragraph 52 of his letter No. 410 S., dated 29th May 1896, and requests that the pay of these Assistants may be declared as progressive, in the case of the former at R25—2—35 and of the latter at R15—2—25. <i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 2540, dated 25th July 1899.</i> —Sanctions the above proposal. Copy of the correspondence forwarded to the Comptroller, India Treasuries, for information (No. 2541, dated 25th July 1899).	A Pros., Mar. 1899, Nos. 1 to 12. (File No. 9 of 1899.) A Pros., Nov. 1896, Nos. 1 to 7. (File No. 11.)	1 2

PROCEEDINGS OF THE

Part B.] DEPARTMENT OF REVENUE AND AGRICULTURE, JULY, 1899.

METEOROLOGY—continued.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
	<i>FILE No. 45 of 1899.</i>		
	<i>Initial pay of the First Assistant of the Kodaikanal Observatory.</i>		
18 and 19	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 463 S., dated 13th June 1899.</i> —Forwards a petition from the First Assistant to the Kodaikanal Observatory together with a copy of a letter from the Director of that observatory in which he recommends that the First Assistant may be granted a personal allowance or that his service for the last two years may be allowed to count for increments. Suggests that the course would be the least objectionable.	A Pros., Mar. 1899, Nos. 1 to 12. (File No. 9 of 1898.)	1
	<i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 2538, dated 25th July 1899.</i> —Allows the First Assistant of the Kodaikanal Observatory to draw R190 a month from the date on which he took charge of his duties at Kodaikanal and to draw annual increments of R20 thereafter up to R250. Copy of correspondence forwarded to the Finance Department for information (No. 2539-45-2, dated 25th July 1899).	...	2
	<i>FILE No. 53 of 1899.</i>		
	<i>Expenditure for telephonic systems required for the Allahabad Observatory.</i>		
20 and 21	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 570 S., dated 17th July 1899.</i> —Requests sanction to an expenditure of R340 for two telephonic systems required for the Allahabad Observatory during the current year in connection with the work of cloud observations.	B Pros., Jan. 1898, Nos. 1 and 2. (File No. 72.)	1
	<i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 2551-53-2, dated 25th July 1899.</i> —Sanctions the expenditure. Copy of the correspondence forwarded to the Comptroller, India Treasuries, for information (No. 2552-53-2, dated 25th July 1899).	...	2
	<i>FILE No. 8 of 1899.</i>		
	<i>Photographs of the Solar Eclipse of 1898.</i>		
22	<i>From the Government of Bombay, Educational Department No. 979, dated 22nd July 1899.</i> —Forwards copy of a letter from the Director, Maharaja Takhat Singji Observatory, Poona, in which he requests to be supplied with paper prints of certain photographs taken by Mr. C. M. Smith, Director of the Kodaikanal and Madras Observatories, at the solar eclipse of 1898, and requests that the necessary instructions may be issued to comply with the request. Copy forwarded to the Meteorological Reporter to the Government of India and Director General of Indian Observatories, with the request that the request of the Director, Maharaja Takhat Singji Observatory, Poona, may, if possible, be complied with (No. 2597, dated 31st July 1899).	B Pros., Mar. 1899, No. 1. (File No. 8.)	2
	<i>FILE No. 20 of 1899.</i>		
	<i>Bromide paper for the Meteorological Department.</i>		
23	<i>From the Director General of Stores, London, No. S. 7153, dated 7th July 1899.</i> —With reference to this office (No. 59, dated 1st June 1899, states that as requested by the Meteorological Reporter to the Government of India and Director General of India Observatories the Bromide paper required for the Meteorological Department will be sent in quarterly instalments in future. Copy forwarded to the Meteorological Reporter to the Government of India and Director General of Indian Observatories for information (No. 2598, dated 31st July 1899).	B Pros., May 1899, Nos. 12 to 16. (File No. 20.)	13

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, JULY, 1899.

[Part B.

METEOROLOGY—concluded.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
	<i>FILE No. 54 of 1899.</i>		
	<i>Continuance of the work of Observations at the Waltair or Sand Hills Observatory in Vizagapatam.</i>		
24 and 25	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 3023, dated 22nd July 1899.</i> —Requests sanction to the continuance of the work of observations at the Waltair or Sand Hills Observatory in Vizagapatam and to an establishment for the purpose at a cost of Rs29 a month. States that the expenditure for the current year will be met from savings in his budget for "storms and special observations."	...	1
	<i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 2581, dated 27th July 1899.</i> —Approves his proposal to continue the work of observation at the Waltair or Sand Hills Observatory in Vizagapatam, and sanctions the appointment of an Observer on Rs23 per mensem and of a Chaukidar on Rs6 per mensem from the 13th July 1899 to 31st March 1900. States that the expenditure for the current year should be met by reappropriation from the grant for storm and special observations in his Budget for 1899-1900. Copy of correspondence forwarded to the Comptroller, India Treasuries, for information (No. 2582, dated 27th July 1899).	...	2

ABSTRACT TABULAR STATEMENT, PART B

OF

PROCEEDINGS

OF

THE DEPARTMENT OF REVENUE AND AGRICULTURE

FOR

AUGUST, 1899.

Matters of Routine—Papers not printed.

METEOROLOGY.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
	<i>FILE No. 39 of 1899.</i> <i>Bombay Magnetical and Meteorological Observations for 1897.</i>		
1	<i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 2679, dated 8th August 1899.</i> —With reference to his letter No. 2650, dated 15th June, 1899, reporting the despatch to the India Office of 21 copies of the above report, points out that under the instructions conveyed in Secretary of State's Despatch No. 17, dated 28th April 1899, only ten copies of Meteorological publications should be sent to the India Office.	B Pros., June 1899, Nos. 11 and 12. (File No. 39.)	5
	<i>FILE No. 11 of 1899.</i> <i>Scientific expedition to be sent to India by the Imperial Academy of Science at Vienna for the purpose of observing the Leonids and Bielids.</i>		
2 to 4	<i>Despatch from Her Majesty's Secretary of State for India, No. 134 (Rev.), dated 15th June 1899.</i> —Forwards a copy of a letter from the Foreign Office, dated 26th May, with enclosures, conveying the request of the Austrian Ambassador that all possible assistance may be given to the scientific expedition which the Imperial Academy of Science at Vienna proposes to send to India in November next for the purpose of observing the Leonids and Bielids, and requests that the assistance which may be necessary be given.	C Pros., March 1899, No. 4. (File No. 11.)	2
	<i>Despatch to Her Majesty's Secretary of State for India, No. 45, dated 20th July 1899.</i> —Reports the steps taken to meet the requirements of the expedition.	...	3
	<i>To the Government of the Punjab, No. 2642—11-4, dated 3rd August 1899.</i> —Enquires whether the Punjab Government will be able to arrange for the erection of pillars for the instruments and for a police guard. Copy forwarded to the Public Works Department with the remark that it is understood that arrangements are being made by the Director General of Telegraphs for the supply of telephone connection (No. 2643—11-4, dated 3rd August 1899). Copy forwarded to the Surveyor General of India for information, with the request that he will depute a survey officer to inspect the station selected for observation, and also depute two photographic assistants (No. 2644—11-4, dated 3rd August 1899).		4

METEOROLOGY—continued.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
	FILE No. 52 of 1899.		
	<i>Grant of a pension to Babu Ram Pershad, late Meteorological Observer of Ajmere.</i>		
5 and 6	<i>From the Comptroller of India Treasuries, No. 276 Pn., dated 12th July 1899.</i> —Forwards, for orders, an application for compensation pension on behalf of Babu Ram Pershad, late Meteorological Observer of Ajmere. <i>Forwarded to the Finance Department, with the recommendation that the pension of Rs 9 in favour of Babu Ram Pershad may be sanctioned (No. 2515, dated 24th July 1899).</i>	...	1
	<i>From the Finance Department, No. 3529 P., dated 3rd August 1899.</i> —Forwards a Resolution sanctioning the grant of a compensation pension of Rs 9 a month to Babu Ram Pershad, late Meteorological Observer, Ajmere, with effect from the 1st January 1899. <i>Copy forwarded to the Meteorological Reporter to the Government of India and Director General of Indian Observatories, for information (No. 2685—52-2, dated 8th August 1899).</i>	...	2
	FILE No. 5 of 1899.		
	<i>Purchase of bicycles for the delivery of the daily weather reports in Madras.</i>		
7 and 8	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 634 S., dated 8th August 1899.</i> —Requests sanction to the purchase of three Singer Bicycles at a cost of Rs 665 for the proper delivery of the weather reports in Madras.	B Pros., June 1899, Nos. 9 and 10. (File No. 5.)	3
	<i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 2693, dated 9th August 1899.</i> —Sanctions the purchase of three bicycles; the expenditure to be met from the grant of office contingencies in his Budget for 1899-1900. <i>Copy of Serial Nos. 3 and 4 forwarded to the Comptroller, India Treasuries, for information (No. 2694, dated 9th August 1899).</i>	...	4
	FILE No. 38 of 1899.		
	<i>Distribution list of the Annual Reports of the Colaba Observatory for 1898-99 and of the Bombay Magnetical and Meteorological Observatories, 1897.</i>		
9 and 10	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 3045, dated 25th July 1899.</i> —Forwards lists of the persons and institutions in Europe to whom copies of the "Bombay Magnetical and Meteorological Observations, 1897," and of the "Annual Report on the condition and Proceedings of the Government Observatory, Bombay, for 1898-99," have been sent from the Colaba Observatory.	B Pros., June 1899, Nos. 16 to 18. (File No. 38.)	4
	<i>To Her Majesty's Under-Secretary of State for India, No. 98, dated 3rd August 1899.</i> —Forwards ten copies of the Report of the Colaba Observatory for 1898-99 and a list shewing how the report has been distributed outside India. Forwards also a list shewing the distribution made outside India of the Bombay Magnetical and Meteorological Observations, 1897.	...	5
	FILE No. 16 of 1899.		
	<i>Leave and last-pay certificates of Captain H. A. D. Fraser deputed to England in connection with the Magnetic Survey of India.</i>		
11 to 16	<i>Telegram from Her Majesty's Secretary of State for India, dated 25th July 1899.</i> —With reference to his telegram of 2nd May last asks for the leave and pay certificates of Captain Fraser; states that the instruments required for the Magnetic Survey cannot be got ready before the middle of 1900, and enquires whether Captain Fraser may remain on furlough until September 1900.	A Pros., May 1899, No. 1. (File No. 16.)	10

**PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, AUGUST, 1899. [Part B**

METEOROLOGY—continued.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
	<i>FILE No. 16 of 1899—contd.</i>		
11 to 16 —contd.	<i>From the Comptroller of India Treasuries, No. G. A. 794, dated 28th July 1899.</i> —Forwards the duplicate last-pay certificate and the certificates of title to leave of Captain Fraser.	...	11
	<i>To Her Majesty's Under-Secretary of State for India, No. 99, dated 3rd August 1899.</i> —Forwards the duplicate last-pay certificate and the certificates of title to leave of Captain Fraser, and intimates that the final leave certificate cannot be issued until the date on which Captain Fraser's leave commenced is known.	...	12
	<i>To the Comptroller, India Treasuries, No. 2718, dated 12th August 1899.</i> —States that Captain Fraser's furlough begins from 1st July last, and will expire in September 1900. Requests that the final certificate regarding his leave may be forwarded for transmission to the India Office.	...	13
	<i>From the Comptroller, India Treasuries, No. G. A. 936, dated 18th August 1899.</i> —Forwards Captain Fraser's last-pay certificate and furlough-papers.	...	14
	<i>To Her Majesty's Under-Secretary of State for India, No. 110, dated 24th August 1899.</i> —Forwards Captain Fraser's last-pay certificate and furlough papers, and states that there is no objection to Captain Fraser remaining on furlough until September 1900.	...	15
	<i>FILE No. 39 of 1899.</i>		
	<i>Number of copies of Meteorological publications to be sent to the India Office.</i>		
17 and 18	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 661, dated 17th August 1899.</i> —Enquires whether the order that ten copies of all publications of the Meteorological Department should be supplied to the India Office, apply to all publications of the Madras, Kodaikanal and Kolaba Observatories.	B Pros., June 1899, Nos. 11 and 12. (File No. 39.)	6
	<i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 2887, dated 25th August 1899.</i> —States that the instructions conveyed in the Secretary of State's Despatch No. 17 Pub. (Records), dated 28th April 1898, regarding the number of copies of Meteorological publications to be supplied to him apply to the publications of the Kodaikanal, Madras and Colaba Observatories.	...	7
	<i>FILE No. 18 of 1899.</i>		
	<i>Jugga Rao Observatory suit.</i>		
19 to 32	<i>Telegram to the Government of Madras, No. 1177, dated 17th April 1899.</i> —"Jugga Rao Observatory. We learn that suit for declaring the trust invalid has been decided against Government. Please obtain Advocate General's opinion as to prospects of successful appeal. He should also advise with reference to section 14, Act VI, 1890, whether the costs of the litigation can be deducted by Official Trustee from the trust monies in his possession."	B Pros., March 1899, Nos. 8 to 10,	4
	<i>From the Government of Madras, No. 661, dated 16th June 1899.</i> —Forwards a copy of the opinion of the Honourable the Advocate General, Madras, as to the prospects of a successful appeal, and as to whether the costs of the litigation can be deducted by the Official Trustee from the trust monies in his possession. In view of the adverse opinion of the Advocate General on the second point, asks for the orders of the Government of India as to how the costs of the suit should be met.	...	5
	Enclosure of above— Opinion of the Honourable the Advocate General of Madras.		

PROCEEDINGS OF THE
Part B.] DEPARTMENT OF REVENUE AND AGRICULTURE, AUGUST, 1899.

METEOROLOGY—continued.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
19 to 32 —contd.	<i>FILE No. 18 of 1899—contd.</i>		
	<i>From the Government of Madras, No. 683, dated 20th June 1899.</i> —In continuation of letter No. 661, dated 16th instant, forwards printed copies of the opinion of the Honourable the Advocate General, Madras, in connection with the Jugga Rao Observatory suit, and of the Counsel's Memorandum therein referred to.	...	6
	Enclosures of above— Opinion of the Honourable the Advocate General of Madras. Mr. J. H. M. Ryan's Memorandum.		
	<i>Telegram to the Government of Madras, No. 2163, dated 23th June 1899.</i> —"India do not intend to appeal in Jugga Rao Observatory case, and decree should be complied with."	...	
	<i>Telegram to the Government of Madras, dated 30th June 1899.</i> —"Please wire exact sum required in addition to funds in hand to meet liabilities under Court decree in Jugga Rao Observatory case."	...	8
	<i>Telegram to the Government of Madras, No. 2223, dated 3rd July 1899.</i> —"Jugga Rao Observatory. Kindly instruct Collector to hand over with observatory all instruments that are under Collector's seal. Eliot writing full details to Collector."	...	9
	<i>Telegram from the Government of Madras, No. 426, dated 11th July 1899.</i> —"This Government requires R4,324-12-0 to meet lawyer's fees and decreed costs in Jugga Rao suit. This is exclusive of R2,591-14-0 interest on Promissory Note which Committee has to refund under decree. Please wire what action should be taken in regard to latter sum."	...	10
	<i>Telegram to the Government of Madras, No. 2375, dated 14th July 1899.</i> —"Your telegram 426 of 10th instant. Charges on account of the Jugga Rao Observatory suit, namely, lawyer's fees and decreed costs R4,324 annas 12 and interest on Promissory Notes, to be refunded by Committee under decree R2,591 annas 14, will be met by Government of India, and necessary instructions issued to Accountant General, Madras, regarding adjustment of expenditure."	...	11
	Copy, with copy of Serial No. 10, forwarded to the Finance Department for information (No. 2504—18-11, dated 21st July 1899).		
	<i>To the Government of Madras, No. 2399—18-12, dated 15th July 1899.</i> —Asks for a statement of account shewing how the sum of R6,916-10 0 to be paid by Government in connection with the Jugga Rao Observatory suit has been arrived at.	...	12
	<i>From the Government of Madras, No. 826, dated 25th July 1899.</i> —Forwards a statement shewing how the sum of R6,916-10-0 has been arrived at.	...	13
	Enclosure of above— Statement of accounts.		
	<i>From the Government of Madras, No. 840, dated 28th July 1899.</i> —Forwards copy of a letter from the Collector of Vizagapatam, in which he reports that the G. V. Jugga Rao Observatory and its appurtenance was delivered to the plaintiff, Mr. A. V. Jugga Rao, on the 14th July 1899, and that the trust money which is now in the form of stock certificates will be delivered to him as soon as the certificates are converted into Promissory Notes.	...	14
	<i>From the Government of Madras, No. 885, dated 8th August 1899.</i> —In continuation of Serial No. 13, forwards a revised statement shewing that the net amount to be paid by Government is R6,794-5-5, not R6,916-10-0.	...	15
	Enclosure of above— Statement of accounts.		
	<i>To the Government of Madras, No. 2812, dated 21st August 1899.</i> —States that the balance of interest on Promissory Notes in the hands of the Collector of Vizagapatam, viz., R1,620-8-7, should be credited as a receipt to Government, and that the necessary instructions have been communicated to the Secretary	...	16

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, AUGUST, 1899. [Part B.

METEOROLOGY—concluded.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
19 to 32 —concl'd.	<p style="text-align: center;"><i>FILE No. 18 of 1899—concl'd.</i></p> <p>to the General Committee of the Jugga Rao Observatory. Authorises the disbursement of R7,414-14-0 to be paid by Government in connection with the observatory suit. Copy, with a copy of Serial No. 15, forwarded to the Finance Department for information (No. 2813, dated 21st August 1899).</p> <p><i>To the Secretary to the General Committee, G. V. Jugga Rao Observatory, Vizagapatam, No. 2814, dated 21st August 1899.</i>—Requests that the balance of R1,620-R-7 in the hands of the Collector of Vizagapatam on account of interest on the trust money may be credited to Government.</p>	...	17
33	<p style="text-align: center;"><i>FILE No. 57 of 1899.</i></p> <p><i>Extension of the Indian telegraph system to Chanch Point on the Kathiawar Coast and the supply of storm warnings to the Observatory at Chanch Point.</i></p> <p><i>From the Foreign Department, No. 2351 I. A., dated 15th August 1899.</i>—Forwards a copy of the correspondence with the Government of Bombay regarding the extension of the Indian telegraph system to Chanch Point on the Kathiawar Coast in order to secure telegraphic connection with a Tidal and Meteorological Observatory which is being established there by the Thakur Sahib of Bhawnagar and the supply of storm warnings to the observatory at Chanch Point. Copy forwarded to the Meteorological Reporter to the Government of India and Director General of Indian Observatories for information and guidance (No. 2917, dated 26th August 1899).</p>	...	1
34 and 35	<p style="text-align: center;"><i>FILE No. 34 of 1899.</i></p> <p><i>Pay of Lala Hem Raj, Second Assistant to the Meteorological Reporter to the Government of India and Director General of Indian Observatories.</i></p> <p><i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 645 S., dated 12th August 1899.</i>—Proposes that the pay of Lala Hem Raj should be fixed at R200—10—250 or that the rate of increment at present sanctioned should be modified.</p> <p><i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 2969, dated 31st August 1899.</i>—States that his proposal cannot be sanctioned. Copy of the correspondence forwarded to the Finance Department for information (No. 2970, dated 31st August 1899).</p>	<p>A Pros., May 1899, Nos 2 and 3. (File No. 34 of 1899.)</p> <p>...</p>	<p>5</p> <p>6</p>
36 and 37	<p style="text-align: center;"><i>FILE No. 59 of 1899.</i></p> <p><i>Return of the value of stores of European manufacture purchased for the Meteorological Department and Colaba observatory during 1898-99.</i></p> <p><i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 3268, dated 14th August 1899.</i>—Forwards a return of the value of stores of European manufacture purchased for the Meteorological Office during the year 1898-99. Copy forwarded to the Finance Department for information (No. 2888, dated 25th August 1899).</p> <p><i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 3314, dated 18th August 1899.</i>—Submits a return of the value of stores of European manufacture purchased in India for the Colaba Observatory during the year 1898-99. Copy forwarded to the Finance Department for information (No. 2973, dated 31st August 1899).</p>	<p>B Pros., Aug. 1898, No. 19. (File No. 43.)</p> <p>...</p>	<p>1</p> <p>2</p>

GOVERNMENT OF INDIA.

ABSTRACT TABULAR STATEMENT, PART B

OF

PROCEEDINGS

OF

THE DEPARTMENT OF REVENUE AND AGRICULTURE

FOR

SEPTEMBER, 1899.

Matters of Routine—Papers not printed.

METEOROLOGY.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
	<i>FILE No. 61 of 1899.</i>		
	<i>Appointment of Mr. H. Whitby Smith as Officiating Meteorological Reporter for Western India, vice Mr. G. L. Towers, who has been granted three months' privilege leave.</i>		
1 to 3	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 3315, dated 18th August 1899.—Reports that the Director General of Telegraphs granted three months' privilege leave to Mr. G. L. Towers and appointed Mr. H. Whitby Smith to be Officiating Superintendent of the Telegraph Office, Bombay, and therefore ex-officio Officiating Meteorological Reporter for Western India, and requests that the grant of three months' privilege leave to Mr. G. L. Towers and the appointment of Mr. H. Whitby Smith may be notified in the Gazette of India.</i>	B Pros., June 1899, Nos. 4 and 5. (File No. 30.)	1
	<i>Notification No. 2898, dated 25th August 1899.—Notifies that Mr. H. Whitby Smith, Officiating Superintendent of Telegraphs in charge of the Bombay Central Telegraph Office, took over charge of the Office of Meteorological Reporter for Western India on the afternoon of the 11th August 1899 from Mr. G. L. Towers, who has been granted three months' privilege leave. Copy forwarded to the Government of Bombay, Public Works Department, and the Meteorological Reporter to the Government of India and Director General of Indian Observatories, for information (Nos. 2899-2899 A-2900, dated 25th August 1899).</i>	...	2
	<i>Notification No. 2898, dated 1st September 1899.—Notifies that for "Officiating Superintendent of Telegraphs" in the above Notification read "Superintendent of Telegraphs." Copy forwarded to the Government of Bombay, Public Works Department, and the Meteorological Reporter to the Government of India and Director General of Indian Observatories for information (Nos. 2990-2992, dated 1st September 1899).</i>	...	3

METEOROLOGY—continued.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
	<i>FILE No. 41 of 1899.</i>		
	<i>Extension of service granted to Babu Hem Chandra Mukherji, 1st class Assistant in the Office of the Meteorological Reporter to the Government of India.</i>		
4	<i>From the Comptroller of India Treasuries, No. 1077 T. D., dated 31st August 1899.—</i> Forwards a statement showing that the extension for one year granted to Babu Hem Chandra Mukherji, 1st Assistant in the Office of the Meteorological Reporter to the Government of India, will expire in August 1900. Copy forwarded to the Meteorological Reporter to the Government of India and Director General of Indian Observatories, with the request that the Government of India may be furnished, in June 1900, with a report as to the fitness or otherwise for further service of Babu Hem Chandra Mukherji (No. 3106, dated 12th September 1899).	B Pros., June 1899, Nos. 4 to 6. (File No. 41.)	4
	<i>FILE No. 64 of 1899.</i>		
	<i>Annual estimates of stores required from England for the Meteorological Department and Colaba Observatory during the year 1900-1901.</i>		
5 to 8	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 3397, dated 26th August 1899.—</i> Forwards an estimate of stores required from England for the Meteorological Department during the year 1900-1901. Enclosure of above— The estimate of stores required for the Meteorological Department during the year 1900-1901.	B Pros., Oct. 1898, Nos. 4 to 7. (File No. 37.) B Pros., Sept. 1898, Nos. 21 to 23. (File No. 37)	1
	<i>To Her Majesty's Under-Secretary of State for India, No. 120, dated 7th September 1899.—</i> Forwards the above estimate and a copy of the letter forwarding it.	...	2
	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 3590, dated 1st September 1899.—</i> Forwards an estimate of stores required from England during 1900-1901 for the Colaba Observatory. Enclosure of above— The estimate of stores required for the Colaba Observatory during the year 1900-1901.	...	3
	<i>To Her Majesty's Secretary of State for India, No. 132, dated 14th September 1899.—</i> Forwards the estimate of the stores required from England during 1900-1901 for the Colaba Observatory.	...	4
	<i>FILE No. 54 of 1899.</i>		
	<i>Establishment for the Waltair Observatory.</i>		
9 and 10	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 695 S., dated 26th August 1899.—</i> Forwards a proposition statement (in duplicate) in connection with the maintenance of the Waltair Observatory. Enclosure of above— The proposition statement.	B Pros., July 1899, Nos. 24 and 25. (File No. 54.)	3
	<i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 3104, dated 12th September 1899.—</i> Sanctions the permanent retention of an observer on Rs 23 per mensem and a chaukidar on Rs 6 per mensem for the Waltair Observatory. Copy forwarded to the Finance Department for information (No. 3105, dated 12th September 1899).	...	4
	<i>FILE No. 8 of 1899.</i>		
	<i>Mr. Michie Smith's photographs of the Solar Eclipse of 1898.</i>		
11 and 12	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 711 S., dated 6th September 1898.—</i> With reference to this Office	B Pros., July 1899, No. 22. (File No. 8.)	3

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, SEPTEMBER, 1899. [Part B.

METEOROLOGY—continued.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
	<i>FILE No. 8 of 1899—contd.</i>		
11 and 12 —contd.	<p>endorsement No. 2597—8-2, dated 31st July 1899, forwards copy of a letter from Mr. Michie Smith, in which he states, that copies of the photographs required by Mr. Naegamvala, Director of the Poona Observatory, cannot be supplied until the publication of his report on the solar eclipse of 1898.</p> <p>Enclosure of above— Letter from Mr. Michie Smith, No. 159, dated 24th August 1899.</p> <p><i>To the Government of Bombay, Education Department, No. 3126, dated 13th September 1899.</i>—Forwards a copy of Serial No. 3 for information.</p>	...	4
	<i>FILE No. 27 of 1899.</i>		
	<i>Kodaikanal Observatory buildings.</i>		
13	<p><i>From the Public Works Department, No. 929 C. W.—B., dated 9th September 1899.</i>—Forwards copy of a letter from the Government of Madras, No. 2182 W., dated 15th August 1899, together with a copy of a reply thereto sanctioning an expenditure of Rs. 1,525 on the provision of a water-supply for the Astronomer's residence at Kodaikanal (Rs. 1,115) and on the construction of a verandah round the clerks' quarters (Rs. 410).</p> <p>Copy forwarded to the Meteorological Reporter to the Government of India and Director General of Indian Observatories, for information in continuation of endorsement No. 2437—27-5, dated 19th July 1899 (No. 3311—27-6, dated 20th September 1899).</p>	A Pros., July 1899, Nos. 1 to 4. (File No. 27.)	
	<i>FILE No. 37 of 1899.</i>		
	<i>Claim of Mr. W. A. Bion, First Assistant to the Meteorological Reporter to the Government of India and Director General of Indian Observatories, for exchange compensation allowance.</i>		
14 to 17	<p><i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 593 S., dated 24th July 1899.</i>—Forwards, for consideration, an application from Mr. Bion, 1st Assistant to the Meteorological Reporter to the Government of India and Director General of Indian Observatories, for exchange compensation allowance.</p> <p>Enclosure of above— Mr. Bion's application for exchange compensation allowance.</p> <p><i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 2787, dated 19th August 1899.</i>—Forwards a form, and requests that Mr. Bion may be directed to fill in and return it.</p> <p><i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 670 S., dated 22nd August 1899.</i>—Returns duly filled up the form forwarded with Serial No. 4.</p> <p>Enclosures of above— The return filled up by Mr. Bion.</p> <p><i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 3165, dated 18th September 1899.</i>—States that Mr. Bion's claim to exchange compensation allowance is inadmissible under the rules.</p>	A Pros., May 1899, Nos. 4 and 5. (File No. 37.)	3
		...	4
		...	5
		...	6
	<i>FILE No. 11 of 1899.</i>		
	<i>Scientific expedition to be sent to India by the Imperial Academy of Science at Vienna for observing the Leoneds and Beleds.</i>		
18 to 20	<p><i>From the Government of the Punjab, No. 814 S., dated 17th August 1899.</i>—In reply to this Office No. 2642—11-4, dated 3rd August 1899, states the Government of the Punjab will arrange (1) for the erection of the pillars required by the scientific expedition to be sent to India by the Imperial Academy of Science at Vienna, and also for the Police guard for the protection of the telephonic lines.</p>	B Pros., Aug. 1899, Nos. 2 to 4. (File No. 11.)	

PROCEEDINGS OF THE
Part B.] DEPARTMENT OF REVENUE AND AGRICULTURE, SEPTEMBER, 1899.

METEOROLOGY—continued.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
	<i>FILE No. 11 of 1899—contd.</i>		
19 to 20 —contd.	<i>To the Government of the Punjab, No. 3312—11-6, dated 20th September 1899.</i> —Intimates the dates on which the expedition will reach Delhi and on which the first observations will be made. Gives the dimensions of the pillars required by the expedition. Copy forwarded to the Public Works Department and the Surveyor General of India for information in continuation of endorsement Nos. 2643-2644, dated 3rd August 1899 (Nos. 3313-3314, dated 20th September 1899).	...	6
	<i>From the Government of the Punjab, No. 1153 S., dated 19th September 1899.</i> —Enquires the date of arrival at Delhi of the scientific expedition. (No orders.)	...	7
	<i>FILE No. 66 of 1899.</i>		
	<i>Grant of compensation gratuities to Arigula Mukund Row Naidu, late Meteorological Observer at Rajamundry.</i>		
21 and 22	<i>From the Comptroller, India Treasuries, No. 437 P. N., dated 30th August 1899.</i> —Forwards, for orders, an application for compensation gratuities on behalf of Babu Arigula Mukund Row Naidu, late Meteorological Reporter at Rajamundry. Forwarded to the Finance Department with the recommendation that compensation gratuities admissible under rules may be granted to Babu Arigula Mukund Row Naidu (No. 3045, dated 8th September 1899).	A Pros., Jan. 1898, Nos. 45 to 47. (File No. 73.)	1
	<i>From the Finance Department, No. 4249 P., dated 15th September 1899.</i> —Forwards a copy of a Resolution sanctioning the grant to Babu Arigula Mukund Row Naidu of compensation gratuities of Rs76 for the superior portion and Rs30 for the inferior portion of his service. Copy forwarded to the Meteorological Reporter to the Government of India and Director General of Indian Observatories for information (No. 3401—66-2, dated 26th September 1899).	...	2
	<i>FILE No. 17 of 1899.</i>		
	<i>Pay of the 3rd and 4th Assistants of the Kodaikanal Observatory.</i>		
23 and 24	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 743 S., dated 19th September 1899.</i> —Requests the formal sanction of the Government of India to the present rates of pay of the 3rd and 4th Assistants of the Kodaikanal Observatory, viz., Rs70 to Rs90 and Rs50 to Rs70 per mensem, respectively.	A Pros., March 1899, Nos. 1 to 12. (File No. 9 of 1898.) A Pros., Sept. 1897, Nos. 1 to 3. (File No. 11 of 1896.) A Pros., Nov. 1896, Nos. 1 to 7. (File No. 11 of 1896.)	11
	<i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 3402—17-12, dated 26th September 1899.</i> —Sanctions the present rates of pay of the 3rd and 4th Assistants of the Kodaikanal Observatory, viz., Rs70—4—90 and Rs50—4—70 per mensem, with effect from the 1st April 1899. Copy forwarded to the Comptroller, India Treasuries, for information (No. 3403—17-12, dated 26th September 1899).		12
	<i>FILE No. 65 of 1899.</i>		
	<i>Detonation in Meteorology for the production of rains.</i>		
25 and 26	<i>From G. E. Turner, Esq., London, dated 11th August 1899.</i> —Forwards a copy of correspondence with the Secretary of State for India and two copies of a pamphlet on the subject of Detonation in meteorology for the purpose of producing falls of rain.	B Pros., Mar. 1897, No. 12. (File No. 13)	1
	<i>To G. E. Turner, Esq., London, No. 3413—65-2, dated 26th September 1899.</i> —With reference to above, states that the Government of India have decided to watch the result of any experiments of the kind which may be undertaken in other countries, but are not prepared to undertake them themselves.	...	2

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, SEPTEMBER, 1899. [Part B

METEOROLOGY—concluded.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
	<i>FILE No. 63 of 1899.</i>		
	<i>Establishment of a storm-warning station and Meteorological Observatory at Dwarka.</i>		
27 to 30	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 3352, dated 22nd August 1899.—Asks for sanction to the establishment of a storm-warning station and meteorological observatory at Dwarka in the north-west point of the Kathiawar Peninsula.</i>	A Pros., Oct. 1889, Nos. 5 to 29. (File No. 3.) A Pros., Feb. 1889, Nos. 1 to 7. (File No. 3.)	1
	<i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 3018—63-2, dated 6th September 1899.—With reference to above, asks for a re-appropriation statement showing how the expenditure during the current year should be met.</i>	...	2
	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 736 S., dated 16th September 1899.—Forwards the re-appropriation statement asked for in the above letter.</i>	...	3
	<i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 3500—63-4, dated 30th September 1899.—Sanctions the establishment of an observatory at Dwarka, and the appointment of an observer on Rs10 per mensem; states how the expenditure during the current financial year should be met. Adds that it is understood that the Baroda Durbar will give, free of charge, the land required for the observatory.</i>	...	4
	Copy of Serial Nos. 1 and 4 forwarded to the Finance and Foreign Departments for information (Nos. 3501-3502, dated 30th September 1899).		

GOVERNMENT OF INDIA.

ABSTRACT TABULAR STATEMENT, PART B

OF

PROCEEDINGS

OF

THE DEPARTMENT OF REVENUE AND AGRICULTURE

FOR

OCTOBER, 1899.

Matters of Routine—Papers not printed.

METEOROLOGY.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
	<i>FILE No. 56 of 1899.</i>		
	<i>Additions to the Imperial Meteorological Office buildings at Alipur.</i>		
1 and 2	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 651 S., dated 15th August 1899.—Requests sanction to certain additions to the Imperial Meteorological Office buildings at Alipur.</i>	A Pros., Nov. 1898, Nos. 1 and 2. (File No. 59.)	1
	<i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 2971, dated 31st August 1899.—Sanctions the additions.</i>	...	2
	<i>Copy forwarded to the Public Works Department for information (No. 2972, dated 31st August 1899).</i>		
	<i>FILE No. 20 of 1899.</i>		
	<i>Bromide paper for the Meteorological Office, Calcutta.</i>		
3	<i>From the Finance Department, No. 4534-S. R., dated 5th October 1899.—Intimates that the Secretary of State has sanctioned the supply of Bromide paper for the Meteorological Office, Calcutta, referred to in the letter to the Under-Secretary of State for India, No. 26, dated 9th March 1899.</i>	B Pros., Mar. 1899, Nos. 3 and 4. (File No. 20.)	14
	<i>Copy forwarded to the Meteorological Reporter to the Government of India and Director General of Indian Observatories for information, with reference to his letter No. 863, dated 8th March 1899. (No. 3637, dated 11th October 1899.)</i>	B Pros., May 1899, Nos. 12 to 16. (File No. 20.) B Pros., July 1899, No. 23. (File No. 20.)	

GOVERNMENT OF INDIA.

ABSTRACT TABULAR STATEMENT, PART B

OF

PROCEEDINGS

OF

THE DEPARTMENT OF REVENUE AND AGRICULTURE

FOR

NOVEMBER, 1899.

Matters of Routine—Papers not printed.

METEOROLOGY.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
1 to 4	FILE No. 38 of 1899.		
	<i>Annual Report of the Madras Observatory for the year 1898-99.</i>		
	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 3718, dated 12th September 1899.—Forwards a copy of the report on the Madras Observatory for the year 1898-99.</i>	B Pros., Aug. 1899, Nos. 9 and 10. (File No. 38.)	6
	Enclosure—The Report.	B Pros., Aug. 1899, No. 1. (File No. 39.)	
	<i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 3404, dated 26th September 1899.—Asks for ten more copies of the above Report.</i>	B Pros., Aug. 1899, Nos. 17 and 18. (File No. 39.)	7
5 to 8	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 328 L., dated 31st October 1899.—Forwards ten more copies of the Report.</i>	B Pros., June 1899, Nos. 16 to 18. (File No. 38.)	8
	<i>To Her Majesty's Under-Secretary of State for India, No. 164, dated 9th November 1899.—Forwards ten copies of the Report.</i>	...	9
	FILE No. 70 of 1899.		
	<i>Pay of the First Assistant of the Astronomical Department of the Colaba Observatory.</i>		
	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 3863, dated 2nd October 1899.—States that it has been pointed out by the Comptroller, India Treasuries, that the pay of the First Assistant of the Astronomical Department of the Colaba Observatory as fixed in the Government of India letter No. 2015, dated 31st March 1875, is progressive, from Rs50 to Rs80, and not Rs80, as shown in his letter No. 4108, dated 29th May 1896. Requests that the pay of the post may be declared progressive, from Rs50, rising to Rs80.</i>	A Pros., March. 1899, Nos. 1 to 12. (File No. 9 of 1898.) A Pros., Sept. 1897, Nos. 1 to 3. (File No. 11 of 1896.) A Pros., Nov. 1896, Nos. 1 to 7. (File No. 11 of 1896.) B Pros., May 1875, Nos. 5 to 10.	1
	<i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 3675, dated 16th October 1899.—Asks for a copy of the letter from the Comptroller, India Treasuries, pointing out that the pay of the 1st Assistant as originally sanctioned is progressive.</i>	...	2

METEOROLOGY—continued.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
	<i>FILE No. 70 of 1899—contd.</i>		
5 to 8 —contd.	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 800 S., dated 17th October 1899.—Forwards a copy of the letter asked for.</i>		3
	<i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 3845—70-4, dated 7th November 1899.—Forwards a copy of Finance Department's Resolution No. 2015, dated 31st March 1875, which sanctioned a progressive pay of Rs50—10—80 per mensem for the 1st Assistant, Astronomical Department of the Colaba Observatory.</i>	...	4
	<i>FILE No. 20 of 1899.</i>		
	<i>Chronometers and instruments for the Colaba Observatory.</i>		
9	<i>From the Finance Department, No. 4935 S. R., dated 23rd October 1899.—Intimates that the Secretary of State for India has sanctioned the supply of chronometers and instruments for the Colaba Observatory referred to in this office letter No. 43, dated 27th April 1899, and No. 58, dated 1st June 1899, to the India Office.</i> <i>Copy forwarded to the Meteorological Reporter to the Government of India and Director General of Indian Observatories for information (No. 3825—20-15, dated 4th November 1899).</i>	B Pros., April 1899, Nos. 10 and 11. (File No. 20.) B Pros., May 1899, Nos. 12 to 16. (File No. 20.)	15
	<i>FILE No. 11 of 1899.</i>		
	<i>Exemption from import duty of instruments and apparatus of the Austrian Scientific Expedition.</i>		
10	<i>From the Finance Department, No. 5104 S. R., dated 8th November 1899.—Forwards a copy of a telegram to the Government of Bombay authorising them to instruct customs authority to exempt from import duty instruments and apparatus of the Austrian Scientific Mission, provided they are re-exported within three months after importation.</i> <i>No orders.</i>	B Pros., Sept. 1899, Nos. 18 to 20.	6
	<i>FILE No. 75 of 1899.</i>		
	<i>Grant of compensation for dearness of provisions to the low paid employes of the Colaba Observatory.</i>		
11 and 12	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 827 S., dated 31st October 1899.—States that the Government of Bombay have sanctioned the grant of grain compensation to low paid employes of Government in accordance with the provisions of Article 72 of Civil Account Code with effect from 1st October 1899, and asks that a similar concession may be granted to the low paid employes who are directly under the Government of India at Bombay.</i>	C Pros., Dec. 1896, Nos. 23 to 27. (File No. 145.) B Pros., Oct. 1896, Nos. 8 and 9. (File No. 145.)	1
	<i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 3935, dated 16th November 1899.—States that under the terms of Article 72 of the Civil Account Code he has discretion to grant compensation for dearness of provisions to the low paid employes of the Colaba Observatory on his own authority after reference to the Local Government.</i>	—	2
	<i>FILE No. 71 of 1899.</i>		
	<i>Adjustment of the expenditure on account of messing the members of the British Astronomical Party during their visit to Talni to take observations of the solar eclipse of January 1898.</i>		
13 to 15	<i>From the Honorary Secretary, British Astronomical Association, London, dated 14th August 1899.—Forwards a copy of a letter from the Deputy Commissioner, Amraoti, preferring a claim for Rs1,760 on account of messing the members of the British Astronomical Party during their visit to Talni to take observations of the solar eclipse of January 1898, and requests that the claim may be remitted.</i>	B Pros., July 1898, Nos. 1 to 4. (File No. 3.)	1

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, NOVEMBER, 1899. [Part B.

METEOROLOGY—concluded.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
	<i>FILE No. 71 of 1899—continued.</i>		
13 to 15 —contd.	<i>To the Honorary Secretary, British Astronomical Association, London, No. 3610, dated 11th October 1899.—Sanctions the remission of the claim for Rs. 1,760 preferred by the Deputy Commissioner, Amraoti. Copy forwarded to the Finance Department for information (No. 3741—71-2, dated 24th October 1899).</i>	...	2
	<i>To the Resident at Hyderabad, No. 3611—71-3, dated 11th October 1899.—Forwards a copy of Serial No. 1, and states that the Government of India have decided to sanction the remission of the claim for Rs. 1,760 preferred by the Deputy Commissioner, Amraoti, in consideration of the delay in preferring the claim. Asks for an explanation of the delay in preferring the claim. Copy of Serial Nos. 1 and 3 forwarded to the Finance Department for information (No. 3612—71-3, dated 11th October 1899).</i>	...	3
	<i>FILE No. 78 of 1899.</i>		
	<i>Temporary establishment for the tabulation of the monthly rainfall data required by the Director of Land Records and Agriculture, Assam.</i>		
16 and 17	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 4232, dated 23rd November 1899.—Requests sanction to the entertainment for one month of two clerks on Rs. 25 each for the tabulation of the monthly rainfall data required by the Director of Land Records and Agriculture, Assam.</i>	...	1
	<i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 4156, dated 29th November 1899.—In reply sanctions the entertainment of two clerks for one month on Rs. 25 each.</i>	...	2
	<i>FILE No. 20 of 1899.</i>		
	<i>Indent for stores of European manufacture required by the Meteorological Department during 1900-1901.</i>		
18 to 20	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 4127, dated 16th November 1899.—Forwards an indent in triplicate for stores of European manufacture required by the Meteorological Department during the year 1900-1901, and gives the addresses of the officers to whom the articles should be supplied.</i>	B Pros., Nov. 1899, No. 9. (File No. 20.) B Pros., Sept. 1899, Nos. 5 to 8. (File No. 64.)	16
	<i>To Her Majesty's Under-Secretary of State for India, No. 177, dated 23rd November 1899.—Forwards for compliance an indent for stores of European manufacture required by the Meteorological Department during 1900-1901.</i>	...	17
	<i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 4086, dated 23rd November 1899.—Points out that the form of the indent does not correspond with the form prescribed in Financial Resolution No. 185, dated 10th January 1883, and requests that the prescribed form may be adhered to in future.</i>	...	18

ABSTRACT TABULAR STATEMENT, PART B

OF.

PROCEEDINGS

OF

THE DEPARTMENT OF REVENUE AND AGRICULTURE

FOR

DECEMBER, 1899.

Matters of Routine—Papers not printed.

METEOROLOGY.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
	FILE No. 71 of 1899.		
	<i>Remission of the claim for messing the British Astronomical Party who were stationed at Talni during the solar eclipse of 1898.</i>		
1	<i>From the Honorary Secretary, Eclipse Committee of the British Astronomical Association, dated 10th November 1899.—Conveys the thanks of the Association for remitting the claim for Rs. 1,760 made against them on account of messing the members of the Eclipse party who were stationed at Talni during the solar eclipse of 1898.</i>	B Pros., Nov. 1899, Nos. 13 to 15. (File No. 71.)	4
	No orders.		
	FILE No. 76 of 1899.		
	<i>Petty works required for the Deputy Director's quarters, Madras Observatory.</i>		
2 and 3	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 860 P., dated 17th November 1899.—Forwards a letter from the Deputy Director of the Madras Observatory in which he requests sanction to the execution of certain petty works in the Madras Observatory.</i>	A Pros., March. 1899, Nos. 13 to 20. (File No. 10 of 1898.)	1
	<i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 4293—76-2, dated 7th December 1899.—Returns the enclosures of the above letter, and states that the Executive Engineer should be informed that reference to the Government of India was unnecessary and that if he requires orders about the repair estimate he should refer the matter to his official superior.</i>	A Pros., Aug. 1897, No. 2. (File No. 168.)	2
	FILE No. 73 of 1899.	...	
	<i>Petitions from the Assistants and Clerks of the Simla Meteorological Office for Simla allowances.</i>		
4 and 5	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 788 S., dated 12th October 1899.—Forwards, for consideration, petitions from the Assistants and Clerks of the Simla Meteorological Office for Simla allowances.</i>	A Pros., May 1899, Nos. 2 and 3. (File No. 34.) A Pros., April 1899, Nos. 1 to 4. (File No. 57.)	1

PROCEEDINGS OF THE

Part B.] DEPARTMENT OF REVENUE AND AGRICULTURE, DEC. 1899.

METEOROLOGY—continued.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
	<i>FILE No. 73 of 1899—contd.</i>		
4 and 5 —contd.	<i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 4330, dated 11th December 1899.</i> —States that after careful consideration of the memorials the Governor General in Council is of opinion that no sufficient cause has been shown for the grant of hill allowances to the memorialists, and requests that the latter may be informed accordingly.	A Pros., Jan. 1898, Nos. 45 to 47. (File No. 73.) A Pros., April 1895, Nos. 1 to 4. (File No. 31.) A Pros., Feb. 1895, No. 6. (File No. 39.) A Pros., April 1893, Nos. 1 and 2. (File No. 17.) A Pros., Nov. 1890, No. 8. (File No. 36 (Surveys). A Pros., May 1890, Nos. 1 to 3. (File No. 11.) A Pros., March 1889, Nos. 2 to 9. (File No. 1.) A Pros., Feb. 1885, Nos. 5 to 11. (File No. 2.) A Pros., Dec. 1885, Nos. 1 to 19. (File No. 2.) B Pros., Dec. 1889, Nos. 144 to 154. (File No. 57 Genl.)	2
	<i>FILE No. 33 of 1899.</i>		
	<i>Mr. Elson's Weather Signal Code.</i>		
6 and 7	<i>From the Government of Bengal, Marine Department, No. 1845, dated 19th September 1899.</i> —In reply to letter No. 1626—33-2, dated 20th May 1899, states that the Local Government will, if necessary, bear the cost of printing 200 copies of Mr. Elson's Weather Signal Code, but considers that the Government of India might contribute some share of the cost as the result would, apparently, be of use for general meteorological purposes.	B. Pros., May 1899, Nos. 10 and 11. (File No. 33.)	3
	<i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 4326, dated 11th December 1899.</i> —States that Mr. Elson's Weather Signal Code for the use of Captains of vessels in the Bay of Bengal should be printed at the Government of India Central Press, Calcutta, and requests that the manuscripts may be sent to the Superintendent, Government Printing with the necessary instructions. Copy forwarded (Nos. 4327—4329 of same date) to the Finance Department, to the Superintendent, Government Printing, and to the Government of Bengal for information.	...	4
	<i>FILE No. 81 of 1899.</i>		
	<i>Application of Mr. Clement L. Wragge of Queensland for the post of the Meteorological Reporter to the Government of India and Director General of Indian Observatories.</i>		
8 and 9	<i>From Clement L. Wragge, Esq., Government Meteorologist of Queensland, and Superintendent, Kos Crusko Observatory and allied stations, dated 12th August 1899.</i> —Submits an application for the post of the Meteorological Reporter to the Government of India and Director General of Indian Observatories.	...	1
	<i>To the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 4396, dated 15th December 1899.</i> —States that Mr. Wragge's candidature for the post whenever hereafter it should fall vacant will be duly noted.	...	2

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, DEC., 1899. [Part B.

METEOROLOGY—continued.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
	<i>FILE No. 69 of 1899.</i>		
	<i>Deletion of the Military Department from the Distribution List of the Administration Reports of the Meteorological Department.</i>		
10	<i>From the Military Department, No. 2397 B., dated 12th December 1899.</i> —Intimates that copies of the Administration Report need not be sent to the Military Department. Copy forwarded (No. 4501, dated 22nd December 1899) to the Meteorological Reporter to the Government of India and Director General of Indian Observatories for information and guidance.	A Pros., Nov. 1899, Nos. 1 to 3. (File No. 69.)	4
	<i>FILE No. 55 of 1899.</i>		
	<i>Cyclone in Negapatam.</i>		
11	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 4466, dated 18th December 1899.</i> —Forwards a copy of a letter from the Meteorological Reporter to the Government of Bengal regarding the late Negapatam storm of the 12th November 1899. No orders.	...	1
	<i>FILE No. 67 of 1899.</i>		
	<i>Grant of compensation pension to certain tabulators of the Office of the Meteorological Reporter to the Government of India and Director General of Indian Observatories.</i>		
12 to 20	<i>From the Comptroller, India Treasuries, Nos. P. N. 482 and 483, dated 14th September 1899.</i> —Forwards, for orders, an application for compensation pensions on behalf of Babus Kedar Nath Basu I, and Kedar Nath Basu II, late 1st and 2nd class tabulators respectively in the Office of the Meteorological Reporter to the Government of India and Director General of Indian Observatories. Forwarded to the Finance Department with the recommendation that the compensation pension admissible under the rules may be granted to Babu Kedar Nath Basu I, and Babu Kedar Nath Basu II, and with the remark that the leave allowance drawn by Babu Kedar Nath Basu II for the period stated by the Comptroller, India Treasuries, need not be recovered from him (No. 3412—67-I, dated 26th September 1899).	A Pros., May 1899, Nos. 2 and 3. (File No. 34 Meteo.) A Pros., April 1899, Nos. 1 to 4. (File No. 57 of 1898.)	1
	<i>From the Finance Department, No. 4529 P., dated 6th October 1899.</i> —Sanctions the grant of a compensation pension of R12-10-8 a month to Babu Kedar Nath Basu II.	...	2
	<i>From the Finance Department, No. 4530 P., dated 6th October 1899.</i> —Sanctions the grant of compensation pension of R19-4-0 a month to Babu Kedar Nath Basu I. Copy of Serial Nos. 2 and 3 forwarded to the Meteorological Reporter to the Government of India and Director General of Indian Observatories for information (No. 3653, dated 14th October 1899).	...	3
	<i>From the Comptroller, India Treasuries, Nos. P. N. 547, 548 and 549, dated 9th October 1899.</i> —Forwards, for orders, applications for compensation on behalf of Babus Abinash Chandra Chatterji, Moti Lal Ghose and Shrish Chandra Roy, late tabulators, Office of the Meteorological Reporter to the Government of India. Forwarded to the Finance Department with the recommendation that the compensation pension admissible under the rules may be granted to Babus Abinash Chandra Chatterjee, Moti Lal Ghose and Shrish Chandra Roy, and with the remark that the leave allowance drawn by Babus Abinash Chandra Chatterji and Shrish Chandra Roy for the periods stated by the Comptroller, India Treasuries, need not be recovered (No. 3684, dated 18th October 1899).	...	4
	<i>From the Finance Department, No. 5274 P., dated 21st November 1899.</i> —Sanctions the grant to Babu Moti Lal Ghose of a compensation pension of R22 a month with effect from the 10th June 1899.	...	5

PROCEEDINGS OF THE

Part B.] DEPARTMENT OF REVENUE AND AGRICULTURE, DEC., 1899.

METEOROLOGY—concluded.

Proceedings Nos.	No. and Date of Letter and Contents.	References.	Serial No. in File.
	<i>FILE No. 67 of 1899—contd.</i>		
12 to 20 —contd.	<i>From the Finance Department, No. 5273 P., dated 21st November 1899.</i> —Sanctions the grant to Babu Abinash Chandra Chatterji of a compensation pension of ₹13-5-4 a month with effect from the 10th June 1899.	...	6
	<i>From the Finance Department, No. 5275 P., dated 21st November 1899.</i> —Sanctions the grant to Babu Shrish Chandra Roy, of a compensation pension of ₹20-2-8 per mensem with effect from the 10th June 1899. Copy of Serial Nos. 5 to 7 forwarded (No. 4152, dated 29th November 1899) to the Meteorological Reporter to the Government of India and Director General of Indian Observatories for information.	...	7
	<i>From the Comptroller of India Treasuries, No. P. N. 700, dated 5th December 1899.</i> —Forwards, for orders, an application for a compensation pension on behalf of Babu Khetter Mohan Ghose, late a draftsman in the Meteorological Office, India. Forwarded to the Finance Department with the recommendation that the compensation pension admissible under the rules may be granted to Babu Khetter Mohan Ghose (No. 4338, dated 12th December 1899).	...	8
	<i>From the Finance Department, No. 5725 P., dated 18th December 1899.</i> —Sanctions the grant to Babu Khetter Mohan Ghose, late a draftsman in the Office of the Meteorological Reporter to the Government of India of a compensation pension of ₹25 a month. Copy, with original papers received with Serial No. 9, forwarded (No. 4549, dated 30th December 1899, to the Meteorological Reporter and Director General of Indian Observatories for information.	...	9
	<i>FILE No. 82 of 1899.</i> <i>Forecasts of the cold weather rains in Northern and Central India, 1899-1900.</i>		
21	<i>From the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 918 S., dated 8th December 1899.</i> —Forwards copies of the Forecasts of the cold weather rains in Northern and Central India, December 1899 to February 1900. Forwarded to the Publisher, <i>Gazette of India</i> , for publication in the <i>Gazette of India</i> (No. 4372, dated 14th December 1899).	B Pros., Dec. 1898, No. 1. (File No. 62.)	1
	<i>FILE No. 42 of 1899.</i> <i>Abandonment of the proposal to establish Flood Warning Stations on the Godavari River.</i>		
22	<i>From the Public Works Department, No. 1302 C. W.—I, dated 15th December 1899.</i> —Forwards a copy of the Proceedings of the Madras Government approving the proposal of the Chief Engineer for Irrigation to abandon for the present the idea of establishing Flood Warning Stations on the Godavari River. Copy forwarded (No. 4548, dated 30th December 1899) to the Meteorological Reporter to the Government of India and Director General of Indian Observatories for information.	B Pros., July 1899, Nos. 13 and 14. (File No. 42.)	3

PROCEEDINGS

OF

THE DEPARTMENT OF REVENUE AND AGRICULTURE
JANUARY, 1899.

METEOROLOGY.

ADDITION OF TWO LOCAL MEMBERS TO THE EXECUTIVE COMMITTEE OF THE
G. V. JUGGA RAO OBSERVATORY, VIZAGAPATAM.

[Proceedings—Nos. 1 to 4.]

No. 1.]

No. 587 S., dated Simla, the 7th October 1898.

File No. 25 c^s
1898.
Serial No. 2.

From—JOHN ELIOT, Esq., M.A., F.R.S., *Meteorological Reporter to the Government of India, and Secretary, General Committee, G. V. Jugga Rao Observatory,*
To—*The Secretary to the Government of India.*

I HAVE the honour, in continuance of the correspondence ending with the publication of the Notification No. 872—13-1, dated 2nd April 1898, changing the rules for the managing of the G. V. Jugga Rao Observatory by which the Managing Committee may be increased by the Government of India so far as it may consider advisable, to state that the General Committee has authorized me to write proposing the addition of two local members, *viz.*—

The Port Officer for the time being, Vizagapatam.

The Superintendent of Telegraphs, Vizagapatam, for the time being.

Of the present local members Raja Gajapati Row is old and infirm and no longer attends the meeting. Mr. Sice has been seriously ill for sometime and unable to attend the meetings of the Executive Committee and the only member available at present is the Collector, who is frequently absent in the Native Hill States under his control.

The General Committee do not consider it desirable to remove the names of the Raja or Mr. Sice from the list, and hence advise the appointment of two additional members in order that the meetings of the Executive Committee may be duly held and the necessary local control in the management of the observatory be duly exercised.

Both the officers whose names are proposed are interested in the work of the observatory and are rarely, if ever, absent from the station.

No. 2.]

No. 2867—25-3, dated Simla, the 21st October 1898.

Serial No. 3.

From—E. MACONOCHE, Esq., *Under-Secretary to the Government of India,*

To—*The Secretary to the Government of Madras.*

I AM directed to forward a copy of a letter No. 587 S., dated the 7th October, from the Meteorological Reporter to the Government of India, in which he suggests that the Port Officer, Vizagapatam, and the Superintendent of Telegraphs, Vizagapatam, for the time being, may be appointed additional members of the Managing Committee, G. V. Jugga Rao Observatory, and to enquire whether the Governor in Council has any objection to their appointment.

No. 3.]

No. 1444, dated Fort St. George, the 30th November 1898.

Serial No. 4.

From—THE HONOURABLE MR. G. STOKES, I.C.S., *Chief Secy. to the Govt. of Madras,*

To—*The Secretary to the Government of India.*

IN reply to Mr. Maconochie's letter No. 2867—25-3 (Meteorology), dated 21st October 1898, I am directed to state that this Government has no objection to the appointment of the

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, JANUARY, 1899.

Pros. No. 4] Addition of two local members to Exe. Comtee. of G. V. Jugga Rao Observatory.

Port Officer, Vizagapatam, and the Superintendent of Telegraphs, Vizagapatam, for the time being, as additional members of the Managing Committee of the G. V. Jugga Rao Observatory.

No. 4.] No. 108—25-5, dated Calcutta, the 10th January 1899.

Serial No. 5.

*From—E. MACONCHIE, Esq., Under-Secretary to the Government of India,
To—The Secretary, General Committee, G. V. Jugga Rao Observatory.*

IN reply to your letter No. 587 S., dated 7th October 1898, I am directed to say that under the circumstances explained the Government of India approve the proposal of the General Committee that the Port Officer, Vizagapatam, and the Superintendent of Telegraphs, Vizagapatam, for the time being, should be appointed additional members of the Executive Committee, G. V. Jugga Rao Observatory.

No. 109—25-5.

COPY forwarded to the Government of Madras for information, with reference to Mr. Stokes' letter No. 1444 (Public), dated the 30th November 1898.

No. 110—25-5.

COPY of the correspondence forwarded to the Public Works Department, for information.

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, JANUARY, 1899.

Transfer of Madras Observatory from Provincial to Imperial control, etc. [Pros. No. 5

**TRANSFER OF THE MADRAS OBSERVATORY FROM PROVINCIAL TO IMPERIAL
CONTROL AND THE REMOVAL TO KODAIKANAL OF CERTAIN INSTRUMENTS,
ETC., PURCHASED FOR THE SOLAR PHYSICS OBSERVATORY AT THAT STATION.**

[Proceedings—Nos. 5 to 8.]

File No. 51 of
1898.
Serial No. 2.

No. 5.]

It will be an Imperial charge. There is no provision in the Provincial Budget to meet it, and I am to ask that the sum required may be provided by the Government of India.

From the Government Astronomer, Madras,—No. 161, dated 30th August 1898.

I HAVE the honour to address you on the following subject.

2. In their letter to the Secretary to the Government of India, Revenue and Agricultural Department, dated 21st November 1893, No. 941 Public (see G. O., dated 21st November 1893, Nos. 940 and 941), the Government of Madras agreed to the proposal that the control of the Madras Observatory should be transferred to the Government of India with effect from 1st April 1894. In consequence, however, of the delay which took place in starting work at Kodaikanal, it was resolved [see letter from the Government of India, Department of Revenue and Agriculture (Meteorology), dated 7th January 1895, No. 57—28, quoted in G. O., dated 16th January 1895, No. 27 (Public)] “to defer the transfer of the Madras Observatory and the funds connected with it until arrangements for the establishment of a Solar Physics Observatory at Kodaikanal are further advanced.”

A Pros., Dec.
1893, Nos. 1
to 7.
B Pros., Jan.
1895, Nos. 7
and 8.

3. As the time is now approaching when I will have to move to Kodaikanal, it seems necessary to raise the question as to when the transfer of the Observatory to the Government of India is to take place.

4. If no unforeseen delay occurs the domes for the new Observatory will reach Kodaikanal towards the end of December, and before that time the towers for their reception will be completed. While the domes are being erected, it will be necessary for me to be constantly at hand, and as soon as they have been erected I will have to set up and adjust the instruments in them. Before that time it is probable that the other parts of the buildings will be far advanced, and my presence will be required for a great part of the time at Kodaikanal.

5. At the same time, until regular observations can be begun, it will not be necessary for me to be there quite continuously and it would be possible for me to continue the supervision of the Madras Observatory visiting it, if necessary, and in any case directing the work and carrying on the correspondence. I would suggest that the best arrangement would be (1) for me to move up to Kodaikanal about 1st January 1899 (or as soon as my presence there becomes necessary), taking with me such staff as will be required which would probably be one Assistant and one peon, and retaining my control over the Madras Observatory; (2) that the transfer of the Observatory, etc., to the Government of India should take place at the beginning of next official year, and that the sanctioned charges in staff, etc., should be made from that date.

6. The only difficulties which I see in the way of this arrangement are financial ones. If I move to Kodaikanal at the beginning of January, it will be necessary for me to send up a large number of books and the instruments that have been received for the new Observatory, and there is no provision in my budget for meeting these charges. It will also be necessary or at least very advantageous to obtain the services of the mechanic who is to form part of the Observatory staff under the revised scheme.

7. I would point out that it is of considerable importance that the books and instruments should be sent up before the end of February, since if they are sent at a later date all will have to be packed in tin lined cases and the cost of sending them up will be nearly doubled.

8. It is difficult to estimate the cost of sending the books and instruments to Kodaikanal, but it may roughly be put at Rs1,500. The other expenses, including travelling expenses, would probably be covered by Rs500, so that the additional expenditure up to the close of the financial year would be about Rs2,000, a sum much less than what is likely to be saved on the building of the Astronomer's house.

9. It may be noted that this sum of Rs2,000 would not be an additional expenditure, as the money must in any case be spent within the next few months, and that in fact, as mentioned above, there will be a considerable saving on the whole by carrying out the removal of the books and instruments during January and February.

10. The delay that has taken place in regard to the starting of the Kodaikanal Observatory is already so great that any further avoidable delay is greatly to be deprecated. If the proposals made above are sanctioned, meteorological observations could be begun in January, and astronomical observations on a small scale soon after. Actinometrical observations could

also be started before the whole of the Observatory is finished. For the actinometrical observations which are considered to be of great importance, the early months of the year are the best, and it would be a great pity if the whole of the favourable seasons was lost.

11. I may add that the Astronomer's house and the quarters of the Assistants and peons will be ready for occupation before the close of the year.

No. 6.]

No. 4804-A., dated Simla, the 3rd November 1898.

SERIAL No. 3.

*From—J. B. BRUNYATE, Esq., Under-Secretary to the Government of India,
Finance and Commerce Department,
To—The Chief Secretary to the Government of Madras, Finance Department.*

IN continuation of paragraph 3 of the letter from this Department, No. 4144 A., dated the 23rd September 1898, I am directed to inform you that, according to the report received from the Accountant General, Madras, a sum of Rs. 2,763-5-3 has been adjusted up to date in his accounts for 1898-99 on account of instruments supplied to the Kodaikanal Observatory, by debit to "26.—Scientific and other Minor Departments," Public Observatories—Provincial.

2. I am to say that, pending the formal transfer of the Observatory to the Government of India, the charges on account of apparatus, instruments and fittings connected with the Observatory will continue to be recorded under the Provincial head "Observatories," but a special assignment for the expenditure will be made from Imperial to Provincial through the Land Revenue head.

ORDERED that copy be forwarded to the Revenue* and Agricultural Department and the Accountant General, Madras, in continuation of

* Original papers returned with copy of notes. the endorsement from this Department, No. 4144 A., dated the 23rd September 1898.

ORDERED also that copy be forwarded to the Comptroller and Auditor General for information.

No. 7.]

No. 3212—51-4, dated Simla, the 18th November 1898.

SERIAL No. 4.

*From—E. MACONCHIE, Esq., Under-Secretary to the Government of India,
To—The Chief Secretary to the Government of Madras.*

IN reply to your letter No. 1281 (Public), dated the 17th October 1898, I am directed to convey sanction to Mr. Michie-Smith moving up to Kodaikanal about January 1899 and removing to that station certain instruments and books, etc., purchased for the Kodaikanal Observatory.

2. With regard to the sum of Rs. 1,500 which, it is estimated, will be required for the removal of the instruments and books, I am to say that there is no objection to this expenditure being incurred. It will be adjusted in the manner indicated in the Finance Department's letter to your address, No. 4804 A., dated 3rd November 1898.

No. 3213—51-4.

COPY of the correspondence forwarded to Finance Department for information.

No. 8.]

No. 3347, dated Simla, the 2nd December 1898.

SERIAL No. 5.

*From—E. MACONCHIE, Esq., Under-Secretary to the Government of India,
To—The Meteorological Reporter to the Government of India.*

A Pros., Nov.
1896, Nos. 1
to 7.
A Pros., Sept.
1897, Nos. 1
to 3.

IN anticipation of the Secretary of State's sanction to the scheme for the proposed extension and reorganization of the Indian Scientific Observatories, the Government of India have decided to include in the Imperial Budget Estimates for 1899-1900 provision for the new scheme as set forth in your letter No. 410 S., dated the 29th May 1896, and as modified in the Despatch to the Secretary of State, No. 56, dated 1st September 1897, a copy of which is enclosed for your information and guidance.

2. I am to request, therefore, that you will be so good as to prepare the necessary detailed estimates as early as possible, in communication with the local authorities. The estimates should show separately the provision required for the different parts of the scheme, viz., Solar Physics, Magnetic Survey and the Meteorology and Astronomy, and they should be prepared in the prescribed form, so as to show the accounts and sanctioned estimates under existing arrangements and the proposed estimate of the revised scheme. The Accounts Officers concerned will be able to supply the figures showing the past and present accounts. Extracts from the Civil Estimates for 1898-99 are appended for reference.

No. 3348.

Ibid.

COPY forwarded to the Finance Department for information, in continuation of endorsement No. 2420—11-10, dated the 1st September 1897.

4.—Meteorology

G. I. C. P. O.—No. 631, R. & A.—21-12-98.—50.—J. S. D. M.

GOVERNMENT OF INDIA.

PROCEEDINGS

OF

THE DEPARTMENT OF REVENUE AND AGRICULTURE

FOR

MARCH, 1899.

METEOROLOGY.

REORGANISATION OF INDIAN SCIENTIFIC OBSERVATORIES.

[Proceedings—Nos. 1 to 12.]

India Office,
London, 22nd September 1898.

Revenue,
No. 173.

To His Excellency The Right Honourable The Governor
General of India in Council.

MY LORD,

Reorganisation of Indian Observatories.

In continuation of my Despatch No. 193, ^{A Pros., Jan. 1898, Nos. 34 to 43.} dated 4th November 1897, I now forward, for the consideration of your Excellency, a copy of Reports ^{F. 68 of 1897.} by the Astronomer Royal and Sir J. Norman Lockyer, and of a letter* from the Royal Society, in reference to the proposed reorganisation of Indian Observatories.

* Dated 27th July 1898, and enclosure.

I have the honour to be,

My Lord,

Your Lordship's most obedient humble Servant,

(Signed) GEORGE HAMILTON.

ENCLOSURES.

The Royal Society, Burlington House, W.,
27th July 1898.

Sir,

With reference to your letter of the 24th March (R. & S. 676), I am directed to inform you that the reports of the Astronomer Royal and Sir J. Norman Lockyer on Indian Observatories (which have been or will be laid before you by those gentlemen themselves) have been considered by the Observatories Committee of the Royal Society; and to submit to you, on behalf of the Committee, the following recommendations and remarks:—

1. The Committee consider that the work of the Indian Observatories should be directed to the following subjects (for some of which provision is already made):—

- (a) Astronomical observations (positions of sun, moon, planets, and fundamental stars).
- (b) Solar physics, as laid down in the reports of the Astronomer Royal and Sir J. N. Lockyer.
- (c) Magnetic observations.
- (d) Meteorological observations.

2. With regard to the astronomical observations, the Committee are informed that the meridian circle now mounted at Madras would (with some alterations) be available for this purpose, and the Astronomer Royal and Sir J. N. Lockyer are agreed that a suitable site for the Astronomical Observatory can be found at Kodaikanal.

3. The Committee suggest that a new spectroscope, as recommended by the Astronomer Royal and Sir J. N. Lockyer, be purchased without delay for observations on solar physics, together with an instrument for obtaining photographs of the surface of the sun in monochromatic light. It is desirable that the daily photographs of the sun be continued at Dehra Dun, at any rate for five years.

4. In view of the suggested magnetic survey, referred to in the next paragraph, the Committee approve the proposal to establish a permanent magnetic observatory in the north of India, and they understand that special facilities exist for this purpose at Dehra Dun.

5. The Committee approve, and attach great importance to, the suggestion that a magnetic survey of India should be undertaken, and enclose a minute by Professor Rücker on the conditions which should, if possible, be fulfilled. The magnetic survey should be under the general direction of a superintendent having special knowledge of terrestrial magnetism.

The Committee also recommend:—

6. That a small board of visitors, composed of a few scientific officials selected by the Indian Government, make an annual inspection of the Indian Observatories, and report to the Indian Government on their condition and administration.

7. That an annual report by the Government Astronomer of India and by the Superintendent of Magnetic Surveys be submitted to the Observatories Committee of the Royal Society.

I am, &c.,

ARTHUR W. RÜCKER,
Secretary, R. S.

The Under Secretary of State
for India.

Minute on the Indian Magnetic Survey ; by Professor A. W. Rücker,
Secretary, Royal Society.

A magnetic survey of a large district may be conducted for one or both of two objects :—

- (1.) To determine the isomagnetic lines for some given date, *i.e.*, the distribution of the magnetic elements cleared as far as possible of all local disturbances.
- (2.) To determine the course of the principal loci of local magnetic disturbance.

The former operation is essential to the latter, as the undisturbed values of the elements must be known before the disturbances can be calculated ; and I should recommend that, in the first instance, places where great local disturbances, due to basaltic rocks, are expected, should be avoided, and that the first object should be to determine the isomagnetic lines.

2. The number of stations at which observations are made for this purpose must depend so largely on what is financially possible that I offer no suggestions, beyond remarking that Dr. Neumayer and I have independently suggested that, where possible, the distance between the stations should not be greater than 40 to 50 kilometres. It is, I suppose, probable that this station-density would be impracticable in India, but whatever decision is arrived at the following conditions should be fulfilled :—

- (1.) The stations should be fairly uniformly distributed over the whole of the district under survey.
- (2.) The survey should be carried out in as short a time as possible, so that the corrections for secular change may be small.
- (3.) The secular change should not be determined from the Observatories only ; but several small groups of stations (the members of each group being relatively near together) should be selected in districts relatively far apart, at which observations should be made at regular intervals, so as to determine the rate of secular change at distant points. The number of such observations must depend on the length of time during which the survey lasts, but if this exceeds five years the observations at these selected stations should be repeated more than once, and in no case should the interval between such repetitions exceed five years.

3. The question as to the instruments to be employed should be carefully considered. The Kew-pattern instruments have the advantage of being those which English magneticians know best, and they are used in the Indian Observatories. Those used by M. Moureaux in the survey of France are, however, much lighter and can be transported more easily, but if employed they should be compared with the Kew instrument at an observatory to determine any constant error. There is not much difference in cost.

In any case, it is very desirable that at least two magnets should be supplied with each instrument for the force and declination observations, and at least three dip needles. Three and four in the two cases respectively would be better. The results obtained with the needles ordinarily employed should be frequently checked by one of those held in reserve, in order to detect any error which may arise from the accidents of travel. The greatest care should be taken to prevent the rusting of the axles of the dip needles. The observer should himself calculate out his results before leaving the station, in order that if any uncertainty arises from any cause the observations may be repeated at once.

4. Corrections will have to be made for diurnal variation, especially in the case of the declination. I understand that this will be obtained from self-registering instruments at three permanent observatories. It may be desirable

to instal a set of absolute instruments at a fourth place (*e.g.*, in the extreme north-west), and to determine the diurnal variation by hourly eye readings, taken so many times a month during the progress of the survey.

5. The instruments used will differ among themselves, and should be carefully compared before the survey begins. These differences probably vary with time and travel, and the comparisons should be repeated directly or indirectly, if possible once a year. Probably a scheme could be arranged by which each instrument could be compared with one or two others annually, without making it necessary to convey any one instrument a very great distance for this purpose.

6. In the above observations I have purposely refrained from making specific recommendations, because much depends on the number of observers and sets of instruments employed, and on the conditions under which the work is carried out. I wish, however, to draw special attention to the fact that, if the magnetic survey is to be thoroughly satisfactory, it should be planned as an independent piece of work; and the questions of how the stations are to be distributed and how the corrections for secular change, diurnal variation, irregular magnetic disturbances (storms), and instrumental errors are to be determined and applied, should all be settled before the work is begun.

No doubt valuable information might be obtained under relatively inferior conditions, but if the experience which has been obtained in Europe is utilized the level attained will be raised. If desired, I should be glad to be of assistance to those to whom the responsibility of carrying on the survey is ultimately entrusted, as many details not referred to above are nevertheless not unimportant.

7. When the fundamental survey above contemplated is complete, I hope that it will be possible to pay some attention to the question of local disturbances. In India these might be of special interest.

ARTHUR W. RÜCKER.

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REPORT

ON

INDIAN OBSERVATORIES, WITH REFERENCE TO THE PROPOSED SCHEME OF RE-ORGANIZATION.

BY

W. H. M. CHRISTIE, C.B., M.A., F.R.S.,
ASTRONOMER ROYAL.

SECTION 1.—INTRODUCTORY.

In a letter from the India Office, R. & S. 2557, dated 29th October 1897, the Secretary of State for India expressed the hope that, as I was going to India to observe the eclipse of the sun, "it would be possible for me to visit Kodaikanal, where my presence would be of the highest advantage in initiating the new and important departure which is under consideration in regard to the observatories in India." After having obtained the necessary leave of absence from the Admiralty, I expressed my willingness to undertake the duty entrusted to me, and arranged to visit Bombay and Madras Observatories as well as Kodaikanal, in order that I might be in a better position, after inquiries on the spot, to report on the scheme for re-organization of the Indian Observatories proposed by the Government of India. As my duties in regard to the work of the Greenwich Observatory necessitated my return early in March, the time at disposal after the eclipse on 22nd January was very limited, and I found it impracticable to visit either Dehra Dûn (where daily photographs of the sun are now being taken satisfactorily) or Calcutta, communication between Calcutta and Madras by steamer being irregular, and slower than the railway route *via* Bombay. I had, however, the opportunity of discussing the question of Dehra Dûn Observatory and of the arrangements for the proposed magnetic survey with the principal officers of the Survey of India (General Strahan, R. E., Colonel Gore, R. E., and Major Burrard, R. E.), who were with me in the eclipse camp at Sahdol.

SECTION 2.—BOMBAY OBSERVATORY.

The Bombay Observatory was established by the East India Company in 1826 at Colaba, its present site, but there is no record of observations prior to 1842, when the magnetic and meteorological department of the Observatory was established. It was not, however, till the year 1846 that the system of observation was put on a proper basis, and trustworthy magnetic and meteorological observations have been regularly made and published from that date to the present time, a period of more than 50 years.

In 1864 a Committee was appointed to inquire into the working of the Observatory, which was then in an unsatisfactory state, and as the result of their recommendations the late Mr. Charles Chambers was appointed Superintendent. New magnetic instruments (self-registering and for absolute determinations) were also obtained, and have been in use continuously since. On the death of Mr. Chambers in February 1896. Mr. N. A. F. Moos was appointed Officiating Director.

I visited the Observatory at Colaba on 5th January and received full information from Mr. Moos as to the instruments and methods of work. Mr. Moos furnished me with a list of the instruments in use,* and of the new instruments which he considered desirable. Of the instruments in use, the transit instrument by Gilbert is very old, dating from 1826, and its pivots are in a bad state. It is possible that if it were thoroughly overhauled and repaired it might be made serviceable, but I feel very doubtful whether it is worth the expense, and I would recommend that a new transit instrument be provided at a cost of about 80%. The sidereal clock is also very old and untrustworthy, and I would recommend that a new clock should be provided at a cost of about 80%. Also an electro-magnetic corrector should be provided for the mean solar clock. These improvements appear to be absolutely necessary to give accurate time for the shipping at Bombay.

* This list is printed in Sir Norman Lockyer's Report.

It is advisable that arrangements should be made for periodical repair of the instruments, which should be sent to England for the purpose, and an annual inspection of the Observatory and report on the condition of the instruments would be very useful in this connection.

The work appears to be carried on very satisfactorily, but several of the instruments are now quite out of date. The wax-paper process is still in use for the photographic registration, and though the results obtained with it are good, it involves much unnecessary labour for the photographers. Mr. Moos proposes to substitute the bromide-paper process now in general use, and I would urge that this should be done as soon as practicable.

The site of the Observatory at Colaba is very unfavourable as regards both magnetic and meteorological conditions, as was pointed out in 1865 by the Committee, who urged that it should be moved to a better locality. This, however, was not done, and since that time the establishment (in the year 1888) of two 38-ton guns in the neighbourhood of the Observatory has introduced a new disturbing element for the magnets. Owing to the magnetic character of the rock (basaltic trap) which crops up through the soil, it is hardly practicable to ascertain the disturbing effect of the guns, with store of shells and accessories, on the magnets, a trial magnetic survey of the Observatory compound showing considerable local variations due to the soil. Notwithstanding these difficulties, natural and artificial, of the site, Mr. Moos has been able to deduce with considerable accuracy the secular change of the magnetic declination for the 50 years 1846 to 1895, a valuable contribution to terrestrial magnetism.

While I feel that the site selected for the Observatory is peculiarly unfortunate, and that it is advisable that the Observatory should be moved, as recommended by the Committee in 1865, the great interest attaching to the determination of the secular change of magnetism at Bombay through a long series of years makes it essential that, when the Observatory is moved, great care should be taken to preserve, as far as possible, the continuity of the magnetic determinations by means of simultaneous observations made at the new and old sites.

SECTION 3.—MADRAS OBSERVATORY.

This Observatory was established in 1792, and valuable astronomical observations have been made, especially under Taylor and Pogson. But astronomical observations (except time-determinations) have been entirely suspended since 1887, the whole strength of the establishment being devoted to working up and publishing the observations which Mr. Pogson had accumulated.

I stayed at the Observatory with Mr. Michie Smith on 6th and 7th February, on my way to Kodaikanal. Mr. Michie Smith gave me full information respecting arrangements made or proposed at Madras and Kodaikanal, and furnished me with a list of the instruments available for use at either observatory.*

The meridian or transit circle, though 40 years old, appears to be a good instrument, but it should be sent to England to be repaired and made thoroughly serviceable, advantage being taken of the opportunity to introduce such modern improvements as may seem advisable. But the growth of trees in the neighbourhood of the Observatory has, in course of years, greatly obstructed the view, so that stars near the horizon can no longer be observed. I would recommend, therefore, that for this reason, as well as for others, the transit circle should be re-erected at Kodaikanal after thorough repair and renovation. A small transit instrument, which is, I believe, available, would suffice for time-determinations at Madras.

SECTION 4.—KODAIKANAL OBSERVATORY.

In company with Mr. Michie Smith I visited Kodaikanal, where this Observatory is now being erected, on 9th February, remaining there four days. Kodaikanal is on a hilly plateau in the south of India, rising very steeply from the plain to a height varying from about 6,000 to 8,000 feet above the sea. The climate is remarkable for moderate temperature, with very small diurnal and annual variation. Mr. Eliot gives the mean temperature of the year 1892 as $58^{\circ}\cdot 5$, with an annual variation of only $8^{\circ}\cdot 1$ (from $54^{\circ}\cdot 1$ for December to $62^{\circ}\cdot 2$ for May). The mean diurnal range was $14^{\circ}\cdot 2$, with very small variation through the year. On the occasion of my visit the weather throughout Southern and Central India was very unfavourable for the time of year, being characterized by cyclones and thunderstorms, and at Kodaikanal there was much mist and cloud. Notwithstanding these abnormal conditions, the sun could have been photographed each morning, and the air was very steady, the definition with Mr. Michie Smith's telescope $3\frac{1}{2}$ inches diameter being very good. At night cloud or mist prevented observation, except on one night, when the definition was found to be very good, stars being remarkably steady close down to the horizon. I was particularly struck with the brilliancy of the Orion nebula as seen in such a small telescope.

The site of the Observatory is on hilly ground near the centre of the plateau, the height being about 7,700 feet above the sea. It appears to be well chosen, commanding a clear horizon all round, with distant hills of about the same height round it; and the conditions for observing would presumably be more favourable than at the station near the edge of the plateau where the meteorological observations were made, or at the hotel where I observed. The Solar Physics Observatory is on the summit of the hill, a somewhat restricted site, and there is a somewhat lower secondary summit to the south-west which would be well suited for the Astronomical Observatory, having a clear horizon, except to the north-west, where a small portion of the sky is cut off by the higher summit.

* This list is printed in Sir Norman Lockyer's Report.

The foundations of the Solar Physics Observatory and of the Astronomer's residence were being laid at the time of my visit, and I discussed the plans on the spot with Mr. Michie Smith on two occasions. The plan provided for three domes or drums of 15 feet diameter at the north, south and east ends of the building, and these, with the polar siderostat on the west, would practically take up the whole available site. In order to provide more room for the equatorials and to allow for possible future expansion, I proposed to make the north and south domes of 18 feet diameter instead of 15 feet, and to omit the east dome and the eastern portion of the building for the present. It also seemed to me that the building was higher than necessary. The suggested modifications have been approved, and are being carried out.

No provision appears to have been made as yet for photographing the sun in monochromatic light by the new Hale-Deslanders method, and I would recommend that, a small addition should be made to the building on the south side to allow of this important work being taken up with as little delay as possible.

SECTION 5.—OBJECTS FOR WHICH THE INDIAN OBSERVATORIES SHOULD BE MAINTAINED.

These were stated by me in the year 1883 in the following letter to the Secretary of State for India, as representing the contribution which, in my view, India should make towards the advancement of Astronomy :—

Dated 14th April 1883.

From—W. H. CHRISTIE, *Royal Observatory, Greenwich,*
To—The Under Secretary of State for India.

"In reply to your letter No. R. S. C. 132 of 3rd February, enclosing correspondence on the subject of the maintenance of the Madras Observatory, and requesting my opinion on the question, I have the honour to offer the following remarks, as the result of a full consideration of these papers, and of the information I have been able to gather respecting the observatories at Madras and Bombay.

"2. Since the matter was discussed in the year 1867, the requirements of astronomical science have changed in several important respects. At that date the pressing need in astronomy was an extensive catalogue of southern stars, and for this work an observatory in the latitude of Madras was not suited. But this want has now been supplied by observatories in the southern hemisphere, and what appears to be most needed at the present time is to link together observations of fundamental stars at northern and southern stations. The comparison which has recently been made of the positions of stars determined at observatories in the two hemispheres, shows discordances, which may arise partly from uncertainty in refraction and partly from errors peculiar to the location and the instrument at each observatory. It would therefore be, in my opinion, very desirable to make accurate observations of a limited number of stars at such an observatory as that of Madras, occupying an intermediate position between those of Europe on the one hand, and those of the Cape of Good Hope and Australia on the other.

"3. Independently of their scientific value, such observations of stars at Madras might be made of direct practical benefit to the Indian Trigonometrical Survey, as has been pointed out by Colonel Walker in his letters of 4th February and 23rd July 1867. To secure this object it might perhaps be desirable to affiliate the observatory to the Trigonometrical Survey, or at any rate to bring it into closer relations with the Surveyor-General.

"4. In addition to observations of fundamental stars, observations of the sun, moon, and planets might be made with great advantage at Madras, where the results would not be subject to uncertainty from refraction. In particular, the determination of the position of the ecliptic from observations of the sun is a matter of great importance in connection with accurate determinations of the positions of fundamental stars.

"5. Again, a new branch of astronomy, *viz.*, astronomical physics, has come into existence since 1867, and this has developed to such an extent that observatories have been established in several countries specially for observations of this class, whilst in England and other countries means have been provided for carrying on spectroscopic and photographic observations at the national observatory. India appears peculiarly suited for such observations, especially those which bear on solar physics.

"6. Taking, then, a general view of the requirements of astronomy at the present day, it would, I think, be desirable to maintain an astronomical observatory in India for the following definite objects :—

- "(a) Determination of accurate positions of the sun and of a limited number of fundamental stars, and, as far as practicable, of the moon and planets.
- "(b) Daily observations of the solar prominences, and of other solar phenomena, with the spectroscope.
- "(c) Daily photographs of the sun. (These are now satisfactorily provided for at Dehra Dun under the superintendence of the Surveyor-General.)

"7. In regard to the question of where such an astronomical observatory should be located, it is to be remarked that the reasons which were urged in 1867 for preferring Bombay

to Madras hardly apply at the present time. The very limited astronomical observations (determination of local time and rating of chronometers) which were then contemplated might be carried on equally well at Bombay or Madras, and they were in fact undertaken at the Bombay Observatory. But the requirements of a port like Madras seem to make it necessary that similar observations should continue to be made there, more especially as Madras time has now been adopted throughout India. Though observations of local time do not in themselves involve the maintenance of an astronomical observatory, properly so called, they furnish a very strong reason for maintaining one already in existence, as the instruments which have been provided for scientific work are equally available for these practical applications. In this connection, I would call special attention to the remarks of the Governor of Madras in the letter dated 5th April 1867, and of the Director of Public Instruction, Madras, in the letter dated 16th January 1867.

"8. I would therefore submit that the Madras Observatory should be maintained on an improved footing for the astronomical observations specified in Section 6, with magnetic and meteorological observations strictly subordinate, and that the Bombay Observatory should be maintained as at present for magnetic and meteorological observations. Though the Madras Observatory should, in my opinion, preserve its distinctive astronomical character, I think it desirable that magnetic observations, to a limited extent, should be made there, as valuable results may be expected from a comparison of magnetic fluctuations at two observatories on opposite sides of the Indian Peninsula. I may remark that systematic observations of the magnetic instruments have been made at Madras continuously, I believe, since the year 1841, though no results have, as far as I am aware, been published.

"9. But while I would strongly recommend the maintenance of the Madras Observatory, it appears to me highly desirable, in view of the past history of observatories in India, that some system of control should be provided with a view to securing their continued efficiency, and that speedy publication of the results of observations on which the value of an observatory almost entirely depends.

"10. Remarking that there is no scientific public in India which could bring the pressure of opinion to bear on the conduct of an observatory, two modes of securing the continued efficiency of the observatories of Madras and Bombay suggest themselves to me :—

"(1) An annual inspection of the observatories by the Surveyor-General, who should report to the Indian Government on their condition and administration.

"(2) An annual report by the directors of the two observatories which should be submitted to a committee to be appointed by the President of the Royal Society as representing the scientific opinion of this country, the President Royal Society, President Royal Astronomical Society, and Astronomer Royal might be *ex-officio* members of the committee, with three or four nominated members.

"I would submit that these, or equivalent, proposals might be adopted with advantage in the case of the two Indian Observatories, as they have already been in the case of most observatories in other parts of the world."

It appears from the Note by the Meteorological Reporter on the future organization of the Madras Observatory (13th October 1891), that the Secretary of State has decided that it is desirable, if not necessary, that an astronomical observatory should be maintained in India for the objects defined in this letter, and they should therefore be taken as the basis of any scheme of re-organization. The requirements of astronomy as regards India remain substantially the same as in 1883, and the need for the observations I have specified has only been emphasized by the advances which have since been made in other countries.

The determination of the recently discovered variation of latitude, implying a small movement of the earth's pole, is a matter of great interest to astronomers, which is closely connected with the scientific work of the Indian Survey. This should now be taken up at the Indian Observatory in connection with the determination of the accurate positions of stars under (a).

In solar physics a method has recently been devised and perfected for photographing the sun's surface and chromosphere in mono-chromatic light, thus showing the relation of sun-spots and prominences. This method could be applied with great success in India, and it is very desirable that this work, which falls under the head (b) in my letter, should be taken up at the Indian Observatory.

But though the programme of work which I indicated in 1883 was apparently accepted by the Secretary of State, the unfortunate accumulation of arrears left by Mr. Pogson led to the suspension of all astronomical observations at Madras, in order that the whole strength of the establishment might be devoted to the computations. The working up and publication of Mr. Pogson's observations are now practically completed. Mr. Michie Smith informs me in a letter dated 12th May 1898 that the original MS. of the catalogue of 5,000 stars (which summarises and completes the whole work from 1862 to 1887) will be complete in another month, and the press copy soon after.

The time has therefore now come when the programme of observation which I formulated in 1883 should be carried out.

SECTION 6.—THE PROPOSED MAGNETIC SURVEY.

The proposal to make a magnetic survey of India appears to have been brought forward by the Meteorological Reporter and by the Surveyor-General at practically the same time. The following note by the Surveyor-General summarizes the matter:—

“Note on the proposed Magnetic Survey of India, by the Surveyor-General of India.

“The subject of a magnetic survey of India has been in my mind for some years, as hitherto no attempt has been made in this Department to take any scientific magnetic observations, which I think is greatly to be regretted. It is true orders have been issued to traverse surveyors to record the reading of the magnetic needle when taking astronomical azimuths and to plane tablers to note the variation as determined by their plane tables, but that is all. Under the most favourable circumstances, in the hands of the most careful observers, these would have given only approximate results, but taken as they were by comparatively untrained and wholly unscientific men, the results have proved to be of no scientific value and of but little use even for survey purposes where great accuracy is not required. When in charge of the Drawing Office in Calcutta, it was a common thing to have inquiries made as to the variation of the needle in such and such a district, and it was very rarely that the question could be answered satisfactorily; in some cases there was no record at all, in others it had been determined so long ago that it was impossible to give a correct answer as the annual alteration was not known.

“In these circumstances I determined to try and do something to rectify this state of affairs, and had already entered into correspondence with the Superintendent, Trigonometrical Surveys, as to the best way of utilising the four instruments for determining the magnetic elements which we possess, when I heard that Mr. Eliot was suggesting a systematic magnetic survey, and a few days ago I had an interview with him, at which he sketched out a rough programme by which we could make the best use of our four instruments, so as to supplement the work that he has proposed to undertake in his Department. It was proposed that two permanent stations, the one at Calcutta and the other at Dehra, should be started by the Survey Department, and that one instrument should be given to the officer who is to conduct the triangulation in Mekran and another to one of the officers working in Burma. These observatories will, so far as I can see, cost the Government absolutely nothing.

“I quite agree with Mr. Eliot in considering that an accurate knowledge of the magnetic elements all over India is of great practical importance, and a chart showing the lines of equal magnetic variation would be most interesting from a scientific point of view and of great value for survey purposes.

“C. STRAHAN,”

13th July 1896.

It will be seen that it was proposed that a systematic magnetic survey should be made by the Surveyor-General's Department, and in June 1896 Captain Burrard, R.E., Superintendent, Trigonometrical Surveys, informed Mr. Moos, the Director of the Bombay Observatory, of the decision of the Surveyor-General to include magnetic observations in the survey operations of his department, and arranged with Mr. Moos to make the Bombay Observatory the base station of the magnetic survey.

SECTION 7.—MR. ELIOT'S SCHEME FOR RE-ORGANIZATION OF THE INDIAN OBSERVATORIES.

Mr. Eliot proposes that the work carried on at the Indian Observatories of Madras and Bombay should be under the general direction of two European officers of high scientific attainments—a Director of Solar Physics and a Director of Magnetic Surveys—stationed at Kodaikanal, but absolutely independent of each other. Each of these would have a staff of native assistants, principally for calculations and scientific investigations. The observatories at Madras and Bombay would be placed under the immediate charge of half-time officers (Professors in the Educational service), who would reside at the observatories, see that the observers carried out their work fully and satisfactorily. The native staff at each of the two observatories would be reduced, provision being made only for time signals and meteorological observations at Madras, and for magnetical and meteorological observations and time signals at Bombay. At Bombay it is proposed to carry on the whole work of observations and tabulation of observations as hitherto, leaving the ulterior discussions to be made by the Director of Magnetic Surveys at Kodaikanal. But at Madras the astronomical work would be entirely dropped, and no provision is made for taking it up at Kodaikanal.

In the programme of work formulated by Mr. Eliot astronomical (meridian and extra-meridian) observations occupy the first place, but somehow, in the working out of his scheme, these have been altogether eliminated, and the astronomical observatory is replaced by a solar physics department and a magnetic survey. I do not think that such an arrangement can be accepted as satisfactory, and the statement made in the letter from the Government of India to the Government of Madras, under date 19th October 1896, that, “if conditions are satisfactory, and funds are available, a third Director may eventually be appointed to carry on the astronomical work,” does not seem to me to recognize the position which the astronomical work should occupy.

But the fundamental of principle of Mr. Eliot's scheme, that the native staff at Madras and Bombay should carry out the work, which must necessarily be done there, under the immediate supervision of half-time officers, residing at the observatories, the scientific officers who undertake the general direction of these observatories (including the responsibility for and discussion of results) being transferred to a more suitable station, seems to me to be well adapted to the conditions of India, and, from the inquiries that I have made, I gather that it would work well both at Madras and Bombay.

I consider, therefore, that Mr. Eliot's scheme, which has been carefully thought out, so as to utilize the money now apportioned to the observatories, may be accepted as a sound basis for the re-organization of the Indian Observatories, subject to provision for the astronomical observations required, and for the carrying out of the proposed magnetic survey under economical conditions.

SECTION 8.—PROPOSED MODIFICATION OF MR. ELIOT'S SCHEME.

Mr. Eliot's scheme does not make any provision either at Madras or Kodaikanal for the astronomical observations (positions of sun, moon, planets, and fundamental stars) which have been recognised as desirable by the Secretary of State. Further, it proposes to create a new permanent scientific department for the magnetic survey, a work which is not permanent in its nature, and which should be completed as rapidly as practicable by the temporary employment of a sufficient staff of trained observers. In the Survey of India Department we have a well-organised scientific staff, which, with a little special training, would be fully capable of carrying out a magnetic survey, as it has already carried out most successfully surveys of cognate nature.

In these two respects Mr. Eliot's scheme seems to need modification. I would propose that the magnetic survey should be undertaken by the Survey of India Department (which can carry it out at little additional expense), and that the two European officers at Kodaikanal should direct the whole of the work at Kodaikanal and Madras, this work to include astronomical observations of position and solar physics observations. Thus, in place of two independent Directors of Solar Physics and Magnetic Surveys, I would propose that there should be the Government Astronomer of India (a post which is abolished by Mr. Eliot's scheme) and a Deputy Astronomer. This would not affect the financial aspect of the scheme, and it would make better provision for the absence on furlough of the Astronomer.

A slight modification might also be made with advantage in the native staff, but this is a minor point.

The following is the modified scheme which I would propose, Mr. Eliot's original scheme being given also for comparison:—

Re-organization of Indian Observatories, Kodaikanal.

MR. ELIOT'S SCHEME.		PROPOSED SCHEME.	
<i>Solar Physics Department.</i>		<i>Astronomical and Magnetic Observatory. (including Solar Physics).</i>	
	R		R
Director	800	Astronomer [R1,000—1,500]	800
First Assistant, R150—250	225	First Assistant	225
Second Assistant, R100—150	137½	Second Assistant	137½
Third Assistant R65—85	80	Third Assistant	80
Fourth Assistant, R50—75	68½	Fourth Assistant	68½
Mechanic	40	Mechanic	40
Two Menial Assistants, R15—25	45	Two Menial Assistants	45
Writer, R30—50	45	Writer	45
Head Peon	12	Head Peon	12
Three Peons	29	Three Peons	29
Two Lascars	17	Two Lascars	17
	<u>1,499½</u>		<u>1,499½</u>
<i>Magnetic Survey Department.</i>			
Director, R600—800	733½	Deputy Astronomer, [R500—1,000]	800
First Assistant, R120—180	165	Second Assistant, R100—150	137½
Second Assistant, R50—70	65	Second Assistant R100—150	137½
Third Assistant, R30—50	45	Third Assistant	45
Two Peons	22		
	<u>1,030½</u>		<u>1,120</u>
GRAND TOTAL	2,529½		2,619

It is proposed that the posts of Astronomer and Deputy Astronomer should be on a scale of salary similar to those of Professors in the Educational Service, but the scale would not necessarily apply to the present Astronomer, who accepted the appointment at a salary of Rs. 800, and whose claims to an increase of salary might be considered independently of future appointments. In my letter of 22nd July 1891 to the Secretary of State, I pointed out the importance of fixing such a scale of salary as would induce a properly qualified man to go out to India and Mr. Eliot originally proposed that the salary should be progressive, a proposal which was strongly supported by the Government of Madras. The men appointed to the posts of Astronomer and Deputy Astronomer should be of the same calibre as Professors in the Educational Service, and to secure such men a similar scale of salary is required. This should be fixed before any new appointment is made.

In the scheme as thus modified the astronomical observations of position might be made at Madras with the existing transit circle, but they could be carried out under more favourable conditions at Kodaikanal, and I would recommend that the transit circle should be moved there after having been sent to England to be thoroughly overhauled and repaired.

As regards the solar physics observations provision should be made for them at Kodaikanal with the least possible delay. They should include photographs of the sun in monochromatic light by the new method, as well as solar spectroscopic observations, both visual and photographic.

The daily photographs of the sun should be continued at Dehra Dun, where they are now being taken satisfactorily under the Surveyor-General's direction, at little or no expense beyond that of the plates and chemicals.

The magnetic survey of India would, in the proposed scheme, be undertaken by the Survey of India Department, and, as will be seen by the Surveyor-General's note, it could be carried out at a little or no additional expense, as it would form part of the survey operations. It is essential, however, that the Superintendent in charge of the magnetic survey should have a special knowledge of Terrestrial Magnetism.

As regards the Bombay Observatory, it seems advisable that it should be placed (at any rate while the Magnetic survey is in progress) under the general direction of the Superintendent of the Magnetic Survey, and serve as a base station for the Survey. I agree with Mr. Eliot's proposal that it should be under the immediate supervision of a half-time officer and that the staff should be constituted as in his scheme.

SECTION 9.—CONTROL.

In my letter of 14th April 1893 I indicated a system of control for the Indian Observatories with a view to securing their continued efficiency. This comprised,—

1. An annual inspection.
2. An annual report to be submitted to a Committee in England.

The second part has been carried out; the reports being duly submitted to the Observatories Committee of the Royal Society.

As regards the annual inspection (which, I suggested, should be made by the Surveyor-General), I would now propose that a Small Board of Visitors, composed of the Surveyor-General, the Meteorological Reporter, and one or two other officials selected by the Indian Government, should make an annual inspection of the Indian Observatories (Kodaikanal, Madras, and Bombay,) and report to the Indian Government on their condition and administration.

But, while it seems to me advisable that there should be this general control, I think it of great importance that nothing should be done to weaken the sense of responsibility of the Government Astronomer, and that he should not be placed under the direction of any other official. He alone should be responsible for the making of the observations considered advisable and for their discussion and publication.

SECTION 10.—SUMMARY OF RECOMMENDATIONS.

1. Provision to be made for astronomical observations (positions of sun, moon, planets, and fundamental stars) and solar physics observations at Kodaikanal, under the Government Astronomer of India, with a Deputy Astronomer and a staff of native assistants.

2. The daily photographs of the sun to be continued at Dehra Dun under the Surveyor-General of India, at any rate for the next five years.

3. The proposed magnetic survey of India to be carried out by the Survey of India Department under a Superintendent, who should have a special knowledge of terrestrial magnetism.

4. The Madras Observatory for time and meteorological observations to be placed under a half-time officer as Superintendent, with a reduced staff (as in Mr. Eliot's scheme), the whole work being under the direction of the Government Astronomer of India.

5. The Bombay Observatory for magnetical and meteorological and time observations to be also under a half-time officer as Superintendent, with a somewhat reduced staff (as in Mr. Eliot's scheme), the whole work being under the direction of the Superintendent of the Magnetic Survey.

6. A small Board of Visitors, composed of the Surveyor-General, the Meteorological Reporter, and one or two other officials selected by the Indian Government, to make an annual inspection of the Indian Observatories, and report to the Indian Government on their condition and administration.

7. An annual report by the Government Astronomer of India, and by the Superintendent of the Magnetic Survey (through the Surveyor-General), to be submitted to the observatories Committee of the Royal Society.

8 Other recommendations on details of arrangements will be found in the body of the Report.

W. H. M. CHRISTIE.

ROYAL OBSERVATORY ;
Greenwich, 15th July 1898.

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REPORT

ON

INDIAN OBSERVATORIES AND THEIR ORGANIZATION.

SECTION 1.—NUMBER OF OBSERVATORIES INSPECTED AND DISCUSSED.

Dealing with the existing observatories, we have in India six institutions in which work other than meteorological is carried on.

Starting from the north these observatories are as follows :—

Simla.—Actinometry.

Dehra.—Solar Physics.

Calcutta (Alipore).—Meteorology (including local forecasts).

Astronomy (time).

Magnetic.

Bombay.—Magnetic.

Meteorology (including local forecasts).

Astronomy (time).

Poona.—Solar Physics.

Madras.—Meteorology (including local forecasts).

Astronomy (time and general).

In addition to these observatories the Government of India many years ago proposed the erection of a hill observatory in Southern India, and the prosecution of solar physics inquiries in addition to the daily photographs of the sun taken at Dehra.

When effect is given to this project, which was locally studied in the Palni Hills in 1885 and finally approved by the Secretary of State in 1893, Calcutta, Bombay, and Madras will each be furnished with a group of two observatories supplying local and general astronomical needs.

In the Inspection, the result of which forms the subject-matter of this Report, I visited all the above-named observatories with the exception of Simla.

SECTION 2.—HISTORY OF THESE OBSERVATORIES.

1. Colaba Observatory.
2. Poona Observatory.
3. Dehra Observatory.
4. Madras Observatory.
5. Alipore (no data received).

THE COLABA OBSERVATORY.

The important services rendered to the Indian Marine by the then purely astronomical observatory of Madras induced the East India Company in 1822 to establish another observatory at Bombay on the opposite coast of the peninsula. The site—the present one—was enclosed in 1823. The building was erected in 1826 by Mr. Curwin, the first astronomer. The instruments originally sent out were returned as unserviceable by Mr. Curwin, who seems to have resigned. The empty building was then assigned as a dwelling house to the Elphinstone Professor of Astronomy, and eventually, in 1840, he was furnished with the transit instrument and clocks at present in use for the purpose of giving time to the shipping and facilitate the rating of chronometers.

In the year 1841 meteorological and magnetical work was added to the programme, Mr. Orlebar being then director. The magnetic instruments had been intended for use at Aden in connection with similar sets at Simla and Madras, but they were finally set up at Bombay with the help of Mr. Caldecott, the Superintendent of the Trevandrum Observatory. With regard to the magnetic instruments, a Joint Committee of the Royal Society and British Association recommended that a magnetic survey of the “neighbouring country” should be undertaken.

In 1845 the programme of work was again expanded. The Geographical Society of Bombay proposed, and the Court of Directors and the Lords of the Admiralty provided, tide gauges for the West Coast, but they do not seem to have ever been effectively used; by 1865 the one at Colaba was the only one in operation. In the same year meteorological observations on the West Coast and at Aden were proposed by the same society.

After Mr. Orlebar, the work of the observatory was subsequently controlled by Commanders Montrion, Mitchison, Ferguson, Robinson and others. During this period the reports seem to have been published regularly year by year and they were submitted to the Astronomer Royal, chiefly "to make the state and proceedings of the observatories known." In 1867 the Astronomer Royal disclaimed the view that "power should be given to any person in England for the direction of the Indian observatories." A change was made in 1885 by the appointment of a Committee of Advice which had some relation to the Royal Society. I know nothing concerning the action of this Committee.

In 1864 the Bombay Government appointed a Committee to inquire into the operations of the observatory, Captain W. C. Barker, I.N., being President.

The following points were those on which the Government required special information :—

1. "The purposes intended by the present operations of the observatory."
2. "The degree of accuracy with which the present purposes are fulfilled."
3. "The improvements which are needed, and the extension of the observatory operations which is desirable, both generally and also with due regard to the class of this observatory and the resources of the Government."

This Committee presented a very valuable report from which most of the previous references to the history of this observatory have been derived, and they commence by stating "the purposes intended by the present operations of the observatory" which are given as follows :—

- (1) To keep and give the exact mean time to the extensive shipping in the harbour
Purposes of the present operations in the different departments. to rate ships' chronometers, and to make such extra observations of special astronomical phenomena as may be of use to science.
- (2) To register the indications of all the instruments measuring the different elements of the weather and climate, for the purposes of science generally, and with special reference to the bearings of meteorology on sanitary science; and to trace the propagation of the changes in the atmosphere from place to place, and the modifications they undergo in transit, with the special object of ultimately giving warning of sudden and violent changes of weather.
- (3) To keep a record of the observed times and heights of tide and to deduce therefrom the formulæ representing their elements at this port, in order to predict these times and heights in future for the use of the shipping.
- (4) To observe and record the variations of the elements of terrestrial magnetism at an important intertropical point of the earth's surface, so as, in conjunction with the operations of other magnetical observatories, to assist in educing the laws of the phenomena of magnetic force, both for the direct advancement of this science and its application to others.

The Committee pointed out that many of the instruments were out of order, that the time balls were not in the best position, that the Meteorological Department was not in a sufficiently efficient state, that the attempts made at original research had been "singularly unscientific," that masses of observations,—tidal, meteorological and magnetical,—had been accumulated without any attempt at discussion, that no attempt had been made to improve methods of reduction, and so on.

Further, the site is objected to, and the transfer of the observatory from the Marine Department is suggested, and it is further recommended that a qualified Superintendent and a Board of Visitors be appointed.

As one of the results of the Report of this Committee, Mr. Chambers was appointed, as whole-time officer, in 1865.

Mr. Chambers' activity in his new position will be gathered from the following list of his published papers. I especially call attention to the 14 volumes containing the Magnetical and Meteorological Observations, 1867—1894.

LIST OF PUBLISHED PAPERS ON TERRESTRIAL MAGNETISM AND METEOROLOGY BY THE LATE CHARLES CHAMBERS, F.R.S.

Compiled by Professor N. A. Moos, Director of Government Observatory, Colaba, Bombay, and by L. A. Bauer.

A.—*Papers Discussed and Published under the Authority of Government.*

On the solar variations of magnetic declination at Bombay. Phil. Trans., 1869, pp. 363—386.

The absolute direction and intensity of the earth's magnetic force at Bombay. Phil. Trans., 1872, pp. 75—90.

The normal winds of Bombay. Appendix I to Bombay Magnetical and Meteorological Observations, 1865—70, pp. 199—212, Bombay, 1872.

On the lunar variations of magnetic declination at Bombay. Appendix III to Bombay Magnetical and Meteorological Observations, 1865-70, pp. 235-242, Bombay, 1872.

Meteorology of the Bombay Presidency. One vol. 4to, pp. 1 to 295, and one portfolio of 82 diagrams, etc. Eyre and Spottiswoode, London, 1878.

Notes on a comparison of two unifilar magnetometers, and on magnetic induction as affecting observations of the intensity of the horizontal magnetic force. Appendix to Bombay Magnetical and Meteorological Observations, 1871-78, pp. [53]—[60], Bombay, 1881.

Bombay Magnetical and Meteorological Observations, 1864 to 1894. Introductions and Compilations, 14 vols., 4to, Bombay, 1867-1895.

Appendices to Bombay Magnetical and Meteorological Observations, 1879—82, one vol., 4to.

- I. History of the set of magnetographs established at the Colaba Observatory, with a new theory of the vertical force magnetometer, pp. [1] to [83].
- II. On the solar and lunar variations of magnetic declination at Bombay in the years 1846—1872, pp. [84] to [137].
- III. On the solar and lunar variations of the earth's magnetic force at Bombay in the years 1847-1872, pp. [138] to [193].
- IV. The solar diurnal variations of declination, horizontal force, and vertical force at Bombay, as derived from the registrations of the Colaba magnetographs, pp. [194] to [235].
- V. Influence of height above or below the ground level upon the diurnal variations of declination and horizontal force, pp. [236] to [241].

Diurnal variations of declination and of horizontal force for each month (and year) of the years 1865 to 1872, deduced from the readings of Grubb's declination magnetometer and of Grubb's horizontal force magnetometer. Appendix to Bombay Magnetical and Meteorological Observations, 1884, pp. [1] to [16].

Appendices to Bombay Magnetical and Meteorological Observations, 1886.

- I. On the luni-solar variations of magnetic declination and horizontal force at Bombay, and of declination at Trevandrum.
- II. Luni-solar variations of magnetic declination at Batavia, and references to later extensions of the investigations of the preceding paper.
- III. On the influence of temperature upon the bifilar magnetometer.
- IV. Effect of heating the magnetograph room on the scale-coefficient of the vertical force magnetograph.
- V. Temperature coefficient of the vertical force magnetograph.
- VI. Temperature coefficient of the horizontal force magnetograph.

Appendices to Bombay Magnetical and Meteorological Observations, 1888-89, one vol., 4to.

- I. History of the set of magnetographs established at the Colaba Observatory, Bombay.
- II. The solar diurnal variations of declination, horizontal force, and vertical force at Bombay, as derived from the registrations of the Colaba Magnetographs [continued].

Appendix to Bombay Magnetical and Meteorological Observations, 1890.

The absolute magnetic declination and horizontal force at Bombay, and their secular and annual variations.

Appendix to Bombay Magnetical and Meteorological Observations, 1891-92, one vol., 4to.

The secular variation of magnetic dip at Bombay during the years 1867 to 1892.

B.—Papers Published by Learned Societies.

On the direct influence of a distant luminary upon the diurnal variations of the magnetic force at the earth's surface. *Phil. Mag.*, March 1858.

On the nature of the sun's magnetic action upon the earth. *Proc. Roy. Soc.*, vol. 12, 1862-63, p. 567.

On the nature of the sun's magnetic action upon the earth. *Phil. Trans. R. S.*, 1863, pp. 503-16. Declination disturbances at Bombay, 1866. *Proc. Roy. Soc.*, vol. 15, 1867, pp. 111—114.

On the uneliminated instrumental error in the observations of magnetic dip. *Proc. R. S.*, vol. 17, 1868-69, p. 427.

On the solar and lunar variations of magnetic declination at Bombay. Part I. *Proc. Roy. Soc.*, vol. 17, 1869, pp. 161, 162.

Observations of the absolute direction and intensity of terrestrial magnetism at Bombay. *Proc. Roy. Soc.*, vol. 17, 1869, pp. 426, 427.

On the lunar variation of magnetic declination at Bombay. *Proc. R. S.*, vol. 20, p. 135, Abstract.

Absolute direction and intensity of the earth's magnetic force at Bombay and its secular and annual variations. *Proc. R. S.*, vol. 20, p. 107, Abstract, *Phil. Trans.*, 1876, pp. 75—90.

On the lunar variations of magnetic declination at Bombay. *Proc. Roy. Soc.*, vol. 20, 1872, pp. 135, 136.

On magnetic induction as affecting observations of the intensity of the horizontal component of the earth's magnetic force. B. A. A. S. Rep., 1877, pp. 33, 34.

Sun-spots and terrestrial phenomena. I. On the variation of the daily range of atmospheric temperature, as recorded at the Colaba Observatory, Bombay. II. On the variation of the daily range of the magnetic declination, as recorded at the Colaba Observatory, Bombay. Roy. Soc. Proc., vol. 34, pp. 231—264.

Examples of the application of a modified form of Sabine's method of reduction of hourly observations of magnetic declination and horizontal force to a single quarter's registrations of magnetographs at the Colaba Observatory, Bombay, to accompany the Second Report of the Committee appointed for the purpose of considering the best means of comparing and reducing magnetic observations. Published with the British Association Report for 1886.

Luni-solar variation of the vertical magnetic force at Bombay for the single quarter, November 1875 to January 1876, to accompany the Third Report of the Committee appointed for the purpose of considering the best means of comparing and reducing magnetic observations. Published with the British Association Report for 1887.

By C. and F. Chambers. On the mathematical expression of observations of complex periodical phenomena, and planetary influence on the earth's magnetism. Phil. Trans., vol. 165, pp. 261—402.

On the luni-solar variations of magnetic declination and horizontal force at Bombay, and of declination at Trevandrum. Proc. Roy. Soc., vol. 40, 1886, p. 316.

On the luni-solar variations of magnetic declination and horizontal force at Bombay, and of declination at Trevandrum. Phil. Trans. Roy. Soc., 1887, vol. 178, A.

Previously to the death of Mr. Chambers, as I shall point out elsewhere, the Bombay Government agreed to the imperialization of the Bombay Observatory on the understanding that the magnetic work was to be continued, and on the 17th February 1896 the Government

of India, promising to transmit shortly the changes to be made in consequence of the imperialization, requested that, pending the decision of the larger question, "any local arrangements that may be made for filling up the vacancy caused by the retirement of Mr. Chambers may be temporary and provisional only."

Under these conditions Professor Moos was appointed temporarily in 1896 to carry on the work of the observatory. He has published among other papers a summary of 50 years results of the Meteorological and Magnetical Observations, and of the records of Grubb's Declinometer.

The Declination Observations, 1894-96.

Notes on the disturbances of the instruments during the earthquake of 12th June 1897, on Dines' Pressure-tube Anemometer, on the Adjustment of Grubb's Declinometer, etc.

THE TAKHTASINGJU SOLAR PHYSICS OBSERVATORY, POONA.*

His Highness Takhtasingju, G.C.S.I., Maharajah of Bhowanagur, in 1882 presented a sum of Rs.5,000 in commemoration of a State visit he paid to Bombay, to form the nucleus of an observatory; an equal sum was given by the Bombay Government.

In 1884, Professor Naegamvala inspected the principal Physical Observatories, both in Great Britain and on the Continent, with a view of determining the best instrumental outfit for the new observatory.

On his return a 16½-inch Newtonian reflector and a small single prism spectroscope by Grubb, and also a grating spectroscope, 1½ inch aperture, by Hilger, were obtained. The Bombay Government was asked to recall from the Solar Physics Observatory at South Kensington the 6-inch Cooke with spectroscope attached which was then on loan there and with which Professor Naegamvala had worked while studying the methods employed in Solar Physics.

After considerable correspondence it was determined to establish the observatory at Poona and the main building of the observatory was erected in 1888. The reflector, however, was not installed till the end of the year 1890. Some spectroscopic work of a preliminary character was done during 1891, but it was found that the instrument used was altogether lacking in stability and was very weak in its driving parts. It was thereupon returned to Sir Howard Grubb for radical alterations.

During the absence of the reflector (1892-93) the 6-inch Cooke (which after its return from Kensington had remained packed in its boxes for want of funds) was mounted in the place of the reflector, and for the two dry seasons the "widening of lines" in solar spots in the region "b—F" was observed. An attempt was made to observe *all* the lines widened, a plan which was found to be altogether too ambitious.

In the meanwhile a demand was made for the 6-inch Cooke by the Indian Government for its transfer to Madras, with the ultimate object of establishing it at the new observatory at Kodaikanal, and the instrument was eventually handed over to the Madras Observatory in 1894. It was found possible, however, to obtain in its stead a 12-inch siderostat by Cooke and an 8-inch lens by Grubb of 112 inches focus, which, with the Hilger grating spectroscope, are now housed adjoining the main building forming the Solar Section of the observatory.

During the years 1894-95 the repaired Grubb reflector was used in photographing nebulae and clusters, and some interesting photographs have been secured.

* Abridged from an account written by Mr. Naegamvala.

In 1896 Professor Naegamvala was sent to Norway to observe the total solar eclipse, and funds were also placed at his disposal to purchase instruments for observing the eclipse of 1898, and for the general improvement of the observatory appliances. With these funds a 6-inch Taylor-Cooke lens equatorially mounted with two objective prisms, a small 1½ inch quartz-spar prismatic camera, parts for a single-prism spectroscope 3-inch aperture, and a new shutter for the dome of the observatory have been purchased. The 16½ inch mirror has also been replaced by one of 20 inches by Dr. Common, thus allowing 40 per cent. more light than before.

Towards purchasing the instruments for the observatory Rs20,000 have been obtained from private sources.

Papers Published.

The following papers have been published by Professor Naegamvala up to the present time :—

- (1) On the Character of the Chief Line in the Nebula in Orion. M.N.R.A.S., li, 7.
- (2) Observation of the Transit of Mercury, 9th May 1891. M.N.R.A.S., li, 8.
- (3) The Spectrum of the Great Sun-Spot Group of February 1892. M.N.R.A.S., lii, 6.
- (4) Note on Nebula No. 6595 of the New General Catalogue. *The Observatory*, August 1895.
- (5) Note on a Photograph of Nebula M 8 in Sagittarius. *Knowledge*, August 1896.
- (6) On the above, and on a method of demonstrating faint details in Photographs. *Journal*, B.A.A., vii, 3.
- (7) Nebula HI, 43 Virginis, M.N.R.A.S., lvii, 8.

THE DEHRA OBSERVATORY.

I shall refer in section 5 to the Memorandum I addressed to the Secretary of State for India in 1877 on the subject of solar photographs in India.

The work was begun, and is still being carried on, at Dehra under the authority of the following letter addressed by the Secretary to State to the Governor General in Council :—

India Office, London,

28th September 1877.

My Lord,

Paragraph 1. With reference to your Industry, Science, and Art Despatch No. 3 of 1877, dated 16th February, requesting that the instruments recently in use at the Roorkee Observatory might be forwarded to this country, I have to acquaint you that I have received from Mr. Lockyer, well known in connexion with the study of Solar Physics, a memorandum on the subject of the photoheliograph, a copy of which is forwarded herewith.

2. Having considered the suggestions made by Mr. Lockyer, and viewing the fact that a study of the condition of the sun's disc in relation to terrestrial phenomena, has become an important part of physical investigation, I have thought it desirable to assent to the employment, for a limited period, of a person qualified to obtain photographs of the sun's disc by aid of the instrument now in India, on the terms explained in the letter that I have caused to be addressed to Mr. Lockyer, a copy of which is enclosed.

3. The photographer engaged for this duty will leave this country about the beginning of November, and on arrival may probably be best placed under the orders of the Superintendent of the Trigonometrical Survey, who, in communication with Colonel Tennant, might propose, for the consideration of your Excellency's Government, the detailed measures for giving effect to the plan of operations suggested by Mr. Lockyer.

4. It will be distinctly understood that the expense of making these observations shall be restricted to what is essential for obtaining the photographs, and that no outlay is contemplated for buildings or other appliances other than of a purely temporary character, the cost of which will be comparatively insignificant. The photographs will be sent to this country for future examination.

5. The stand of the photoheliograph will be retained in India, and a fresh tube will be sent there to replace that used by Colonel Tennant, which should be sent here as proposed. The other instruments may also be sent to England, and will be placed in the custody of the Science and Art Department, which has offered to take charge of them.

I have, &c.,

(Signed) SALISBURY.

In a letter to me, dated 24th October 1877, from the India Office, information was conveyed as to what steps had been taken to carry out the above recommendations.

It was arranged that Mr. Meins, a highly intelligent sapper who had been trained by me, should proceed to India and take photographs of the sun under the direction of Colonel Walker, to whom was left the choice of Mr. Meins' destination.

Thus, from the beginning of 1878 solar photographs were regularly taken at Dehra Dun in North-Western India, and were forwarded to the Solar Physics Committee at South Kensington for reduction.

Unfortunately Mr. Meins died on 31st March 1879, and the continuity of the Indian daily record was consequently broken until its resumption in December 1879.

In August the Government of India requested to be informed as to the importance of the continuance of the records interrupted by Mr. Meins' death.

In a letter dated 27th November 1879, a reply to the above request was sent by the Chairman of the Solar Physics Committee, in which it was pointed out what advantage had already resulted from the Indian photographs, the following statement being made:—

"The Astronomer Royal has been so kind as to furnish the Committee with a list of the solar photographs taken at the Royal Observatory during the period 21st July 1873 to 18th July 1879, over a part of which Mr. Meins' work extended. It should be mentioned that in both places alike the rule was to take three photographs daily, in the morning, about noon, and in the afternoon, when clear views of the sun could be obtained. In the rare cases in which a fourth photograph was taken on the same day in India, it is not included in the following list":—

Total number of days during which both instruments were working simultaneously, between 11th February 1878 and 31st March 1879	384	
	Greenwich.	India.
Total number of photographs, reducing where four or more have been taken to three	207	872
Number of days on which one at least was taken	143	342
Number of days on which no photograph was taken	244	42

In view of these facts the Committee was of opinion that the series of Indian sun photographs should be resumed as early as practicable, and should be continued without break at all events for three or four years to come, the then period of increasing solar activity being one of peculiar scientific interest.

The Committee further suggested that the Surveyor-General of India, under whom Sergeant White, the successor of Mr. Meins, would be employed, might usefully be instructed to cause one or more native employes of the Survey Department to be instructed in the process of solar photography, so that risk of interruption of the series from sickness, etc., of the European photographer might be guarded against in the future.

The foregoing letter was submitted for consideration to the Government of India, and in February 1880 the India Office acquainted the Solar Physics Committee with the measures taken to resume the series of daily photographs of the sun's disc. By November in the same year it was reported that the work was being carried on systematically at the Trigonometrical Survey Office at Dehra and that that office possessed a sufficient number of employes to carry on continuously for the future the daily photographs of the sun, the taking of which was resumed in December 1879.

Since that date there has been a weekly despatch of pictures from India to England. At least two negatives have been taken daily in fair weather, and silver prints made of all the negatives.

THE MADRAS OBSERVATORY.*

The Madras Observatory was founded by the East India Company in 1792 "for promoting the knowledge of Astronomy, Geography and Navigation in India." Sir Charles Oakeley, who was then President of the Council and deeply interested in the subject, anticipating the orders from the India House, carried out the design under his own authority, so that when the actual orders arrived the observatory was already built and partly supplied with instruments. This was rendered possible by the liberality of a member of the Madras Government, William Petrie, Esq.

On the south wall of the observatory is a slab bearing the following inscription:—*Astronomiæ Consecratum Sumptibus Societatis Anglicanæ in India mercaturæ faciendæ faventis Carolo Oakeley, Baro Praefecto Præsidiis Sancti Georgii A.D. MDCCXCII.*, and a translation in Tamil, Telugu, and Hindustani is carved on the granite pier in order that "Posterity may be informed a thousand years hence of the period when the mathematical sciences were first planted by British liberality in Asia."

The first Astronomer was Mr. J. Goldingham, who also held the appointment of Government architect. His earliest observations, made in 1793, are recorded in a manuscript volume, prefaced by an account of the building of the observatory. Two folio volumes contain the observations made by him between 1812 and 1825, while another volume contains an account of pendulum determinations made near the Equator and at Madras. He also determined the longitudes of a number of stations in India and elsewhere, and made a long series of observations on the velocity of sound by means of the Fort and Mount time guns.

A meteorological register was begun in 1796.

The second Astronomer was Mr. Thomas Glanville Taylor, F.R.S., who was in charge of the observatory from September 1830 till early in 1848. He received his training as an astronomer at Greenwich Observatory. He erected new and much more powerful instruments. These consisted of a five foot transit instrument, a mural circle of four feet in diameter, and a five foot equatorially mounted telescope by Dollond. With these instruments Mr. Taylor began the construction of his star catalogue, which, in its final form, was published in 1844, and contains the places of over 11,000 stars.

Hourly meteorological and magnetical observations were begun in 1840 by Captain Ludlow, and transferred to the observatory in 1845, when the buildings were considerably enlarged. Taylor's observations are contained in seven published volumes.

* The following particulars have been condensed from Mr. M. Smith's Report to the Chief Secretary to Government, dated 23rd May 1892.

In 1849 Captain W. S. Jacob, of the Bombay Engineers, was appointed Government Astronomer in succession to Taylor, who died in 1848. He published one volume of astronomical results. Captain Jacob resigned the appointment early in 1859. So far as I can make out the magnetical observations were discontinued in 1855.

The Office of Government Astronomer was held during the next two years after Captain Jacob's death part of the time by Major W. K. Worster, R.A., and the other part by Major (now General) J. F. Tennant, R.E. The instruments up to that time in use having become obsolete, it was resolved to replace them by modern instruments of a high class, a change which caused much delay in the work of the observatory for several years. In 1861 the late Mr. N. R. Pogson arrived at Madras as Government Astronomer, and found the erection of the new transit circle still far from complete, so that it was not till May 1862 that it was fully ready for use. This instrument has a telescope of 5 inches aperture and a circle 42 inches in diameter read by six microscopes. It was made by Messrs. Troughton and Simms.

In 1866 a new equatorial with an 8-inch object glass was erected on the roof of the Astronomer's house. Mr. Pogson accumulated a vast quantity of observations. The transit circle was employed for the preparation of a catalogue of 5,000 stars, each of which was observed five times. The whole of these observations, which were made almost entirely by the Native assistants, were reduced as soon as possible after they were made, and four volumes containing the results for the first twelve years have been published.

On the death of Mr. Pogson in 1891 Mr. Michie Smith succeeded him.

SECTION 3.—CONCLUSIONS TO BE DRAWN FROM THESE HISTORIES.

It is clear that the earlier observatories to which reference has been made were not established merely to supply stringent local needs,—time signals and the rating of chronometers being among the first,—but it is also clear that as time went on other local needs were added, tide tables and weather forecasts among them, and in course of time everything which had not especially to do with these needs, all the pure researches, contemplated possibly by persons unacquainted with the local circumstances had to give way more or less,—the magnetical observations at Madras, the observations in general astronomy and the magnetic survey of the Bombay Presidency, are cases in point,—and at last disappeared from the programme of work.

Even the reduction and discussion of the observations made were at length discontinued, and all this time, in consequence of the isolation of each establishment, of the lack of general control, of reports of progress to a competent local authority or committee, or even of inspection, there was no machinery for preventing breaks of continuity, or neglect, or for bringing about a better state of things for the future.

It would appear that the Government were under the impression that there was a control by the Astronomer Royal, but that official himself disclaimed it.

The local needs of India are getting greater every day; at each of the ports more work is required in the shape of local weather forecasts, examination of chronometers and other instruments, and new observations with seismological and magnetic and meteorological instruments are asked for.

Under the present conditions, then, basing my opinion upon what has happened, it is my firm impression that things will not improve with this increase of area of observation, unless there be a definite scientific control in India itself to co-ordinate the various establishments, to inspect them, and to insist upon continuity and efficiency as well as economy in every branch of the work.

For the local needs there must always be duplication of work; for the wider needs it can and should be reduced to a minimum, but this can only be accomplished by an officer in charge of the whole effort, and by an officer on the spot. The Observatories Committee of the Royal Society and the Solar Physics Committee of the Science and Art Department, no doubt can render great service in making suggestions and acting as courts of appeal; but, as the late Astronomer Royal pointed out in 1867, they are, and must remain, ineffective in matters of control.

In Britain a well-used method of controlling the work of observatories is that of appointing Boards of Visitors. This method cannot be employed in India—the men are not there.

SECTION 4.—THE PRESENT CONDITION OF THESE OBSERVATORIES, WITH RECOMMENDATIONS.

1. The Colaba Observatory.
2. The Poona Observatory.
3. The Dehra Observatory.
4. The Madras Observatory (no information).
5. The Alipore Observatory.

The Colaba Observatory.

I inspected this observatory on 28th January, Professor Moos rendering me every assistance.

The accompanying plan shows the present arrangement of the buildings.

The following list of instruments at present in use for observational purposes was handed to me by Professor Moos:—

Name of Instrument.	Maker.	Year in which first used.	REMARKS.
ASTRONOMICAL.			
Sidereal Clock	Thwaites and Reed .	1840	
Transit Telescope	W. and T. Gilbert .	1840	
Collimation Meridian Mark	Seid Mohsin .	1840	
Chronograph	T. Cooke and Sons .	1897	
Electric Clock	Shephard and Sons .	1872	
Mean Time Clock	Samuel Cave .	1840	
Old Mercurial Pendulum Clock	Not known .	1840	
MAGNETICAL.			
Magnetometer, Kew Unifilar, No. 23 .	Elliot Brothers .	1867	On loan from Elphinstone College.
" " " " 131 .	Nalder and Brothers .	1896	
Dip Circle	Henry Barrow .	1867	
New Dip Circle	Dover Charlton .	1897	
Old (Induction) Apparatus used as Magnetometer.	Not known .	1845	
Grubb's Horizontal Force Magnetometer, with Thermometer.	Grubb	1842	Not in use since 1885.
Grubb's Declination Magnetometer .	Grubb	1842	
Vertical Force Magnetometer	—	
Collimation Meridian Mark	Not known	1842	
Transit Telescope for Declination	Dollond	1842	
Declination Magnetograph and Vacuum Gauge.	Adie	1870	
Horizontal Force Magnetograph Thermometer and Vacuum Gauge.	"	1870	
Vertical Force Magnetograph, No. 1 Thermometer and Vacuum Gauge.	"	1870	
Vertical Force Magnetograph, No. 2 Thermometer and Vacuum Gauge.	"	1893	
METEOROLOGICAL.			
Barometer, No. 58, and its attached Thermometer.	Newman	1842	Spare.
Barometer, No. 48, and its attached Thermometer.	"	1847	
Barometer, No. 51, and its attached Thermometer.	"	1847	
Standard Air Thermometer, No. 401 .	L. Casella	1871	
Standard Wet Thermometer, No. 402 .	L. Casella	1871	
Rain Gauge	J. Newman	1846	
Rain Gauge, Symon's No. 5797	L. Casella	1877	
Grass Radiation Thermometer, No. 106255	L. Casella	1893	
Sun Thermometer, No. 37982	Negretti and Zambra	1885	
Maximum Air Thermometer, No. 1689 .	Murray and Heath	1867	
Minimum Air Thermometer, No. 1353 .	" " "	1865	Observations recorded since 1875. Observations recorded since 1875.

Name of Instrument.	Maker.	Year in which first used.	REMARKS.
METEOROLOGICAL—concl'd.			
Minimum Wet Thermomter, No 1349 .	Murray and Heath .	1867	Observations recorded since 1871.
Maximum Thermometer, No. 539 . .	Casella . .	1871	
Minimum Thermometer, No. 535 . .	" . .	1871	
132 inches Ground Thermometer . .	Newman . .	1879	
60 inches Ground Thermometer . .	" . .	1851	
20 inches round Thermometer . .	" . .	1851	
9 inches Ground Thermometer . .	" . .	1847	
1 inch Ground Thermometer . .	" . .	1847	
Barograph and Thermometer . .	R. W. Munro . .	1871	
Self-registering Barometer . .	L. Casella . .	1897	
Photographic Air Thermometer . .	R. W. Munro . .	1871	
Photographic Wet Thermometer . .	R. W. Munro . .	1897	
Pluviograph	Designed by F. Chambers	1875	
Beckley's Anemograph	R. W. Munro . .	1867	
Dines' Pressure Tube Anemometer . .	R. W. Munro . .	1897	

It will be seen from the list that most of the instruments used in the determination of time are of very old pattern. The transit instrument is dated 1826, and the "want of cleanness of its axis" struck me as it did the Committee of 1865. When funds are available I recommend that a new transit and clock be provided. One of Cooke's transits costing about 80%, similar to that in use by the students in the Royal College of Science, is all that is needed for the purposes for which it is intended.

The time ball service seemed well attended to, Bombay time being notified. I suggest that in future an additional signal be made so that a difference of five hours from Greenwich time, that is, the time of the 75th meridian, be signalled to the shipping.

Professor Moos indicated to me the want of several meteorological and magnetical instruments and pointed out also the advisability of increasing the staff, but as these matters are certain to be considered when the imperialization of the observatory is carried out, I say, nothing about them here.

With regard to the present system of preparing the paper for the photographic records Professor Moos has informed me as follows:—

"The photographic work is very heavy, as we wax and sensitize our own paper. The process is the same old one discarded long ago by the English observatories. It has been slightly modified, and the result at this observatory at least has been quite successful, the loss of record being absolutely nil and the charts without any flaw. The substitution of bromide paper will no doubt considerably lessen the burden on the photographers, as the time spent in the first three processes, that of waxing, iodising, and sensitizing will be saved. This observatory has been selected by the Seismological Committee of the British Association as one of their stations, and seismological apparatus are shortly to be sent out by the Secretary of State, and in connection with that probably the bromide process will have to be used at this observatory. As in any sudden change of process there is a danger of loss of curve which is sure to follow the introduction of a new process, I think it advisable to wait for a year or so when the photographers will be thoroughly conversant with the new bromide process in connection with seismological apparatus, and I shall then, with the sanction of the Observatories Committee, adopt the bromide paper if the change is found necessary for all photographic self-recording instruments."

This seems the proper course to adopt.

As the observatory stands where it did in 1823 in spite of the very carefully considered recommendations of the Committee of 1865, there must be some dominating reason for the retention of the present site, although, so far as the adjacent fort is concerned, the conditions are, I believe, not much worse than they were formerly. I attempted to get precise information about the change of condition and find that at present the quantity of shell in store is only liable to small alteration as the guns are fired only at one practice annually.

The erection of another first class magnetic observatory at Alipore perhaps makes this question less important than it was when Bombay possessed the only magnetic record.

A considerable number of chronometers and other instruments are sent to the observatory to be compared, but the system of the observatory charging a fee, in vogue in 1864, seems to have lapsed, and whatever sum is paid goes to the assistants. I consider this a bad system. I suggest that the old system be adhered to, complete statistics of instruments examined and fees paid being given in the Annual Report of the observatory.

POONA SOLAR PHYSICS OBSERVATORY.

The accompanying plan shows the present location of the observatory buildings. It will be noticed that the plot of ground on which they stand is very restricted and that it is close to two roads and a railway. There is, therefore, a considerable amount both of dust and vibration. The railway is within 100 yards of the observatory and numerous trains pass both day and night. Nor are these the only objections to the present site. A dense mist arises both morning and evening from the river, which is some 900 yards away from the buildings.

Up to last year all the work done by Professor Naegamvala in the observatory was performed in addition to his full-time duties as Professor of Physics in the College of Science and without any extra remuneration. The Bombay Government has, however, by a recent resolution, relieved him of the duties of the professorship, and, in future, his work will be solely confined to that connected with the observatory.

The main building of the observatory consists of a centre-room 20 feet in diameter, over which is the equatorial room surmounted by a dome 18 feet in diameter with a shutter opening 2 feet beyond the zenith. On the left of this is a room 20 feet \times 20 feet, which is used as a transit and clock room, and also as a general instrument store-room. On the other side is a photographic room.

A detached building 20 feet \times 12 feet is used as the solar physics room and contains the 8-feet horizontal telescope.

A simple temporary building with sliding roof has just been sanctioned. Under this will be housed the new Cooke Prismatic Camera.

Instruments and work proposed to be done with them.

(1) A Cassegrain Equatorial Reflector by Sir Howard Grubb with Russell control and mouse-wheel electric fine-motion in AR; mirror 20 inches diameter, 135 inches focus, by Dr. Common,—to this is attached a 6-inch finder. It is proposed to mount on the tube two portrait lenses 4 inches and 1½ inch diameter respectively, and to use the reflector and the two lenses in simultaneously photographing nebulae and clusters from 20° N. to 30° S.

(2) A 12-inch siderostat by Cooke, an 8-inch lens 112-inch focus, by Grubb, horizontally mounted, and a spectroscope, 1½-inch aperture with Rowland grating by Hilger (partially spoilt). Arrangements are being made to attach a camera to the spectroscope. These instruments will be exclusively used for daily observations of lines widened in sun-spots.

(3) A 6-inch lens, Taylor-Cooke triplet 93-inch focus, equatorially mounted on a very massive stand with two prisms of 45°, 8 ins. \times 6 ins. face. This will be employed in studying stellar spectra photographically, particularly in the Southern Heavens.

Besides these, the following minor astronomical and physical instruments are in the possession of the observatory:—

- (a) Position micrometer by Grubb.
- (b) Parts, *viz.*, slit collimator camera and 60° prism for a 3-inch spectroscope.
- (c) Three-inch transit by Cooke.
- (d) Sidereal clock by Cooke.
- (e) Four-inch induction coil.
- (f) Rosenthal galvanometer.
- (g) A set of batteries.
- (h) A set of small accumulators.
- (i) A Sprengel's pump.
- (j) Set of vacuum tubes.
- (k) Set of pure chemicals.
- (l) Photographic materials, etc.

It is proposed to carry on the work with instrument No. 2 continuously during every clear day of the year, and to forward the observations to the Solar Physics Committee for reduction and discussion.

Staff.

To carry out the above programme it is proposed that the Staff in the future may consist of the following in addition to the Director:—

- (a) Two assistants, the senior assistant being at times put in charge of solar work;
- (b) One instrument keeper; and
- (c) A menial staff of a man and a boy.

Professor Naegamvala has proposed that residential quarters near the observatory should be provided for the assistants and instrument-keeper. This has been accepted in principle by the Bombay Government, and quarters for one assistant have been sanctioned.

To keep up the observatory, to supply it with photographic plates and materials, and to meet miscellaneous expenses, including the occasional purchase of small instruments, Mr. Naegamvala has asked Government to allow for the present a yearly grant of Rs500.

Inspection.

I inspected the Poona Observatory on 29th January, after the receipt of the following letter:—

No. 117 of 1898.

From the Secretary to Government to Sir J. Norman-Lockyer,
K.C.B., F.R.S.

Educational Department, Bombay Castle,
27th January 1898.

Sir,

I am directed to state that this Government will be highly obliged if you can make it convenient to visit the Government Observatory at Poona, and favour Government with any suggestions you may have to make regarding the working of the observatory. The Director of Public Instruction who, I believe, is in personal communication with you, will make arrangements for the inspection.

I have the honour to be,

Sir,

Your most obedient Servant,

(Signed) A. C. LOGAN,

Acting Secretary to Government.

I was more rejoiced than I can say to find that by a recent development of the Observatory, about which I had heard nothing previously, Mr. Naegamvala, who, so far I know, is the only person in India practically familiar with solar physics work (he was for some time in the Solar Physics Observatory at South Kensington), had been placed in such a favourable position for carrying on observations.

Of the instruments above enumerated I saw very little, as Mr. Naegamvala had only just returned from observing the eclipse, on which occasion he had used most of them. He was good enough to show me the results he had obtained, and I found them of a high order of excellence, while the programme of work he undertook showed a large grasp of the various solar problems which await solution at such times. To justify this statement I give the programme here.

Programme of the work undertaken at the Eclipse, 22nd January 1898:—

(1) Prismatic camera, equatorially mounted, 6-inch aperture, two prisms of 45°. Special photographs just at the commencement of totality and at the end. Photographs attempted, seven, and a running plate extra.

(2) Prismatic camera, 1½-inch aperture, quartz and spar. Photographs attempted, nine secured eight.

(3) Slit spectroscope, 3-inch aperture, image formed by an 8-inch lens, 112-inch focus. One photograph.

(4) Visual 6-inch telescope cut down to 4-inch. Six corona pictures, moon, 7/8-inch diameter.

(5) Portrait lens, 4-inch diameter, 20-inch focus. Five photographs.

(6) Three-inch equatorial telescope with a powerful slit-lens, direct-vision spectroscope, used visually.

(7) A four-prism spectroscope deprived of its collimator.

(8) Three-inch equatorial for colour (Taccchini), and forms of prominences.

(9) An integrating spectroscope, 1½-inch aperture to take 3° round the sun. (No record.)

(10) Meteorological and shadow band observations; duration, visibility of the corona visibility of stars, effect on plants and animals, etc.

I consider that the assistance proposed is sufficient for present needs, but as the Observatory is connected with an important College at Poona I think it well to point out how additional assistance, if required, can be afforded with great benefit to both institutions, by introducing a system which has been in operation for many years at the Royal College of Science. This is to allow a student who has shown great aptitude to spend a year in the Observatory, after he has taken his associateship, as teacher in training at a small weekly stipend.

I learn that at Poona a somewhat similar system is in vogue. There are post-graduate scholarships (called Dakhochina Fellowships) awarded to the most successful graduates of the year; they are usually tenable for a period of two years. If one of these fellowships were to be assigned to the Observatory, it would not only help the work of the Observatory, but would enable the Educational Department to obtain men practically versed in physical astronomy, and such men on leaving the Observatory might prove much more useful and valuable in teaching such subjects as physical geography and physiography than science graduates fresh from the class.

I would recommend therefore that if the occasion arises this suggestion should be acted on, experimentally in the first instance.

I am of opinion that eventually a better site should be provided.

Other suggestions for the future working of the Institution will be found in the accompanying copy of a letter which, at his request, I wrote to the Director of Public Instruction (E. Giles, Esq.), before leaving Poona :—

Poona,

29th January 1898.

My dear Sir,

Before I leave Poona, and in anticipation of my report on the Observatory here, which I shall not be able to prepare before my return home, it may be useful to state briefly the following opinions which I have formed :—

1. The Observatory is well equipped with instruments, and there is no need of any large expenditure on this head for some time to come.

2. Mr. Naegamvala is a thoroughly competent observer, and the direction of the Observatory may, I think, safely be confided to him when once a programme of work has been settled.

3. Work along several important lines of research can be commenced at once in the present locality.

4. The present locality is not a good one, and sooner or later a site free from vibration and road dust should be found if long period exposures are necessary.

5. The most useful work to take in hand at first is the daily routine observation by eye and photography of the widened lines in the spectrum of sun spots.

6. I think that the Solar Physics Committee would be prepared to discuss and publish these observations in connection with the observations made at home, in the same way that the daily solar photographs taken at Dehra are treated.

7. Photographs of stellar spectra should also be taken of some of the southern stars. These and other observations should be published by the Observatory, in order that Mr. Naegamvala may have an opportunity of showing originality and skill in facing special problems.

8. The (assistant) staff asked for is not unreasonable.

9. Temporary buildings only should be erected at present, as rapid changes in the best way of attacking new problems often occur, and require alterations in the distribution of instruments.

I am, dear Sir,

Very Sincerely yours,

(Signed) J. NORMAN LOCKYER.

THE DEHRA OBSERVATORY.

I visited the Observatory at Dehra on 7th February, and Colonel Gore, R.E., and Mr. Eccles rendered me every assistance in my inspection. I append a plan shewing the location of the two observatories.

I found the photoheliograph, with which the 8-inch pictures are taken daily, excellent condition. Wet plates are still used, and Colonel Gore, who has made a careful inquiry into the matter, has come to the conclusion that no dry plate at present available is so good as a wet one under the conditions at Dehra.

When it was proposed that the Survey Office should be removed from Dehra, it was suggested by Mr. Eliot that the Observatory should also be transferred and re-erected at Kodaikanal.

Even if the transfer of the Survey had been carried out, the removal of the Observatory to any other locality would have been of very doubtful policy, for the reason that the bad days at Dehra and Mauritius are fortunately almost complementary. And since we are absolutely dependent upon these two stations for the filling of gaps in the Greenwich series, to disturb such a happy state of things till we are certain that there is some other station in India with absolutely identical meteorological conditions, from the point of view to which I now refer, might destroy the present continuous record. I append a table showing how this matter stands based upon the photographs taken in the years 1891-96.

Table showing days on which no Solar Photographs could be taken at Dehra, and on which the gaps in the series were filled by Photographs taken at Mauritius.

Year.	Blank Days. Dehra.	Blank Days. Dehra + Mauritius.
1891	January 11, 16, 17 22, 23, 24, 27. February 1, 2, 11, 16, 20, 25, 26, 27. March 6, 11, 12, 13. April 9, 12. May 24. July 8, 12, 14, 16, 21, 22, 24, 25, 31. August 4, 5, 6, 7, 12, 13, 14, 15, 21, 25, 26, 27, 28. September 4, 5, 6, 9, 12, 13, 17, 18, 23, 28. October 4, 22, 30.	January 22, 24, 27. February 25. March 11, 12. July 22. September 17.

Table showing days on which no Solar Photographs could be taken at Dehra, and on which the gaps in the series were filled by Photographs taken at Mauritius—contd.

Year.	Blank Days. Dehra.	Blank Days. Dehra + Mauritius.
1892	January 1, 20, 22, 27, 28. February 4, 7, 12, 13, 14, 25. March 1, 3. May 1, 13. June 6, 12, 24, 25, 29. July 8, 9, 14, 18, 19, 21, 22, 25, 26, 27, 28. August 1, 3, 7, 8, 9, 10, 11, 14, 15, 16, 17, 19, 20, 23, 24, 27. September 1, 2, 6, 10, 12, 13, 14, 17, 18, 23, 24, 25. December 15, 16, 29, 30.	January 20. February 12, 13, 14. March 1, 3. August 23.
1893	January 2, 3, 4, 12, 13, 15, 16, 17, 23, 24, 28. February 4, 5, 6, 12, 13, 15, 16, 18, 19, 21, 22. March 5, 6, 10, 11. April 3. May 2, 30, 31. June 1, 20, 21, 22, 24, 27, 29, 30. July 1, 3, 4, 5, 9, 10, 13, 14, 15, 17, 19, 23, 31. August 1, 2, 3, 4, 6, 8, 9, 19, 26, 27, 28, 31. September 3, 4, 5, 10, 12, 16, 18, 19. October 4, 18. November 19, 20. December 25, 30, 31.	January 28. March 6. June 24. July 3. December 31.
1894.	January 1, 18, 19, 20, 21, 22, 26, 27. February 2, 4, 6, 8, 9, 13, 28. March 1, 4, 16. April 13. June 10, 11, 16, 19, 22, 28. July 16, 19, 24, 25, 26, 27, 28, 29, 30. August 2, 3, 5, 6, 9, 10, 11, 15, 16, 17, 24, 28, 29, 31. September 3, 4, 5, 6, 7. October 4, 5, 6. November 4, 5. December 4, 7, 10, 11, 14, 22, 23, 29, 31.	January 1, 20, 27. March 16. December 7.
1895.	January 1, 4, 7, 8, 9, 14, 21, 22, 24, 31. February 8. March 2, 18. April 1, 2, 3. June 24, 30. July 1, 2, 25, 27, 28. August 3, 4, 7, 11, 12, 13, 14, 15, 16, 17, 25, 29, 30. September 2, 3. October 24. November 26, 27. December 2.	January 7. June 30. September 3.
1896.	January 7, 13, 28, 31. February 2, 6, 14, 24, 26, 27, 29. March 22, 28. May 13. June 21, 24, 26, 27. July 13, 15, 16, 20, 21, 30. August 1, 2, 4, 5, 6, 9, 10, 13, 17, 18, 19, 21, 24, 25. October 28. November 6, 21, 22, 23. December 28, 30.	February 14. July 15. August 10.

With regard to the large photoheliograph which gives 12-inch pictures, the result of my inspection was not so satisfactory. Owing to death and the transfer of officers who were familiar with its working, it has not been used for some years, for one reason that no note of the special method of focussing the image on the screen necessitated by the fact that the object glass is corrected for G light had been left behind. Since some plates exposed at the apparently visual focus had not been successes the idea was formed that the apparatus was inefficient. The erroneousness of this view could not be demonstrated at Dehra because, unfortunately, no glass positives of the exquisite plates previously obtained and sent to the Solar Physics Committee had been retained as standards to work up to.

In consequence of this disuse the dome has been taken possession of by bees. I have sent out some glass allowing chiefly G light to pass through so that the original method of focussing may be re-established, and I trust the 12-inch series will soon be recommenced, especially as I have also informed Mr. Eccles of a chemical method of getting rid of the bees, which has been suggested to me by Professor Tilden.

What I saw and heard at Dehra leads me to the conclusion that, under Indian conditions, observations over heated roofs should be avoided where fine definition is required. Wherever possible the building from which observations are made should be on the ground and stand apart, and iron domes should also be carefully avoided.

Since the idea of the transfer of the survey has been abandoned, and since the work costs nothing, except the chemicals and glass (for I was assured by Colonel Gore that if the observatories were transferred there could be no reduction of the staff), I strongly recommend that if this work is also done at Kodaikanal, for which I see no necessity, the Dehra series shall not be interrupted until there is abundant evidence that the Dehra-Mauritius record is worse than the Kodaikanal-Mauritius one on an average of years.

THE MADRAS OBSERVATORY.

I visited the Madras Observatory on 18th February, and I thought it best to devote the time I could spend there to examining the provisional plans of the proposed Solar Physics Observatory at Kodaikanal and in endeavouring to ascertain what routine work was proposed for that station and when it was to begin. I refer to both these topics later in Section 10.

The following list of instruments at present at Madras has been forwarded to me at my request by Mr. M. Smith:—

List of Principal Astronomical Instruments at Madras Observatory.

- 1 Meridian circle (*see* Madras Meridian Circle Observations, 1862, 1863, 1864).
- 1 Small transit instrument.
- 1 Equatorial (8-inch Troughton and Simms).
- 1 „ (6-inch Cooke).
- 1 Twin telescope visual lens 6-inch Lerebour and Secretan, photographic 6-inch Grubb.
- 1 Grubb lens 6-inch aperture 40-feet focus.
- 1 Photoheliograph (Transit of Venus form).
- 1 Mean time clock (Shepherd and Sons).
- 1 „ (Kullberg).
- 1 Sidereal clock (Dent).
- 1 „ (Shelton).
- 1 „ (Haswall).
- 1 Chronometer, mean time.
- 1 „ sidereal.
- 1 Chronograph.
- 1 Spectrograph, concave grating, 10-feet focus, mounted on Rowland's plan.
- 1 Spectroscope, 6 prisms.
- 2 Spectroscopes (old patterns).
- 1 Micrometer for measuring spectrum photographs.
- 1 Large siderostat (polar) 11-inch mirror.
- 1 Small siderostat (polar).
- 1 Induction coil and battery.

Several small telescopes and minor appliances.

It is proposed to transfer some of these instruments to the new Solar Physics Observatory.

My recommendations will be found in Section 10.

THE ALIPORE OBSERVATORY.

I inspected this Observatory on the 14th February. I give a plan showing the position of the present buildings. Like the observatories of Bombay and Madras this Observatory meets local and special needs. Its local needs consist of time-ball and local forecast. Its special function is that it is the most important of the observatories under the Meteorological Reporter, and in it all instrumental tests and verifications are made. It is of importance to refer to this part of the work at length as its thoroughness is unsurpassed.

The following are the chief verifications of instruments undertaken in the laboratory. All the instruments as received from England, or returned from the Mathematical Instrument Office after repair, are examined.

Barometers.—As soon as they are sent here their vacuum, pouch, and other mechanical conditions are examined. They are then suspended for comparison and a couple of test readings are taken. They are then allowed to rest in the suspended state for some days, after which comparative readings are taken with the standard barometer both at rising and falling pressures. The usual dates of recording the readings are on six successive days.

Aneroids.—These instruments are compared both at ordinary pressures and in the vacuum chamber at lower pressures, both falling and rising.

Thermometers.—After examining their mechanical conditions, they are first compared at the freezing point, then with the standard thermometer in water at intervals of about 20°. After this comparison, the maximum and minimum are exposed in cages in the thermometer shed with standard maximums and minimums, and four comparative readings are taken daily for about a week to see how their action compares with the action of the standards. Those that are found to be irregular in their action, or otherwise defective, are condemned and not issued. The order is “return into store” when they are sent to the store of the

Mathematical Instrument Department, who allow a certain proportion of their value. The same remark applies to all other defective instruments.

Solar radiation thermometers.—These instruments are compared by being exposed with the standard solar radiation thermometer on stands for about 20 days.

Boiling-point thermometers.—Boiling point of these thermometers are tested in the Regnault's apparatus.

Dial anemometers.—These instruments are set up on the south-west turret of the Observatory building, which is about 50 feet above the ground, comparative readings are taken with the standard dial anemometer for about 10 days. Anemometers that are found to have much friction, or to be otherwise defective, are sent to the Mathematical Instrument Office for repair.

Rain-gauges and rain measuring glasses.—Diameters of the mouths of rain-gauges are measured with a brass-gauge, and whether the mouths are circular or not is also determined. The capacity of rain-measuring glasses are also determined.

These are the most ordinary kind of instruments compared in the Observatory, but other instruments are also examined and compared.

The number of different classes of meteorological instruments examined and verified at the Observatory during the past seven years is given in the annexed table :—

Number of Instruments verified during the past seven years by the Alipore Observatory.

Instruments.	1890-91.	1891-92.	1892-93.	1893-94.	1894-95.	1895-96.	1896-97.
Barometers	99	81	86	50	76	102	107
Aneroids	15	13	10	25	35	10	19
Dry and wet bulb thermometers	85	77	33	69	32	65	30
Standard thermometers	40	6	4	2	2	...	1
Minimum thermometers for air temperature	98	86	98	98	70	88	90
Maximum thermometers for air temperature	56	61	86	47	96	103	60
Minimum thermometers for nocturnal radiation	17	9	13	3	3	3	...
Solar radiation thermometers	13	2	12	4	6	13	3
Sling thermometers	11	...	...	...	...	1	...
Traveller's maximum and minimum thermometers, in pairs	4	...	...	...	2	...	...
Six's thermometers	2	6	1	...	...	1	...
Common thermometers . . . . .	...	...	1	2	1	9	6
Boiling point thermometers . . . . .	...	4	2	...	...	...	...
Rain gauges . . . . .	...	826*	80*	184*	2	1	...
Measure glasses for rain gauges . . . . .	...	2,584*	3	1	...	...	...
Spirit levels . . . . .	...	195	...	...	...	...	...
Sand glasses	28	...	23	20	11	...	1
Brass gauges for testing rain gauges . . . . .	...	136	...	...	...	...	...
Anemometers	46	57	72	64	26	54	48
Air meters . . . . .	...	...	...	...	...	3	...
Richard Freres barograph . . . . .	...	...	...	...	...	...	1
" " thermograph . . . . .	...	...	...	...	...	...	1
Total	515	4,143	524	569	362	453	367

The astronomical work is carried on in the transit room on the south-east of the main building. It contains a transit instrument and three astronomical clocks. The time is obtained by meridian observations of the sun, and not by stars. Two time-balls, one on the Semaphore Tower, Fort William, and another on the roof of the Port Commissioner's Office, are dropped daily. All the three clocks are disconnected from the floor of the room; two are fixed to pillars built for the purpose and the third to the wall of the room. The pendulums of the first two oscillate in the direction of north to south and that of the third east to west, so that in case of earthquake all the clocks may not be equally affected. The chronometers of the Indian Marine Department and of vessels under the Port Officer, Calcutta, are lodged and rated at the Observatory. As long as they remain at the Observatory, they are rated and are issued at the demand of the Marine Department or the Port Officer. I suggest that an additional time signal be given shewing the time of the 90th meridian from Greenwich, that is 6 hours from Greenwich time.

In the grounds is a set of four underground thermometers. One is placed on the surface of the ground, the bulb of the second one foot underground, that of the third three feet underground, and that of the fourth six feet underground.

Observers for fossil meteorological stations are from time to time sent to this Observatory to be trained in their duties.

I found arrangements being made for the establishment of a first-class magnetical observatory.

SECTION 5.—SUCCINCT STATEMENT OF THE GOVERNMENT PROPOSALS.

One part of the action of the Government during the last quarter of a century has depended upon the consideration that India would eventually gain by utilising the Indian conditions to study the sun in close connection with the related terrestrial phenomena.

* The great majority of these instruments were tested at the workshops of the Mathematical Instrument Department by the Chief Observer of the Alipore Observatory.

When I was in India in 1871, Lord Mayo, the then Viceroy, requested me to visit Simla to report on a site for a solar physics observatory. I was unable to do this, as I was then Secretary to the Duke of Devonshire's Royal Commission on Science, and on referring for permission to His Grace an extension of time was refused. Some time after the scheme which was then before the Indian Government fell through, as it was bound to do, by its scale, Lord Salisbury permitted me to draw up and send to him a memorandum showing what India could do at small expense.

This I did, and I give it here :—

26th June 1877.

"In accordance with the request made to me, I beg to send the following remarks on the Despatches dealing with the Indian instruments :—

1. Let me premise that solar research is now being specially carried on in Europe at—
 - (1) Potsdam, in the new Sonnenwarte.
 - (2) Paris, in the new Physical Observatory.
 - (3) Rome and Palermo.
 - (4) South Kensington, in connection with the Science and Art Department.
 - (5) At Greenwich, Wilna, and other places it is carried on in a less special way.
2. In these European observatories, however, especially in the more northern ones, we are attempting to make bricks without straw, that is, the climate is such that the observations are often interrupted, at times for weeks together, while in addition to this, in winter the sun's altitude is so small that fine work is impossible.
3. While this state of things holds in Europe, in India, on the other hand, one has an unlimited and constant supply of the *raw material*, by which I mean that there one can, if one chooses, obtain observations of the finest quality in sufficient quantity all the year round. I may even go further, and say that, limiting my remark to English ground, we have in India a monopoly of the raw material.
4. I learn from the papers sent to me, that although most of the instruments are already out in India, there is no immediate prospect of the establishment of a solar observatory on an extended scale for the purpose of securing observations over the whole field.
5. Although students of science cannot but regret that this is so, I still think there is no doubt that the new European establishments to which I have referred, and the proposed Russian observatory north of the Himalayas, render observations in India, over the whole field, of less vital importance than they were when the Indian observatory was first suggested.
6. I beg permission, however, to urge that what we most want now, and what we cannot get satisfactorily in Europe, can be supplied by India without the erection of an observatory in the sense in which that word occurs in the despatches, and at an outlay which need not exceed, let us say, 300*l.* a year.
7. I refer to daily photographs of the sun's disc, which for the present, at least, can be obtained by the photoheliograph already in India. An intelligent sapper with a slight knowledge of photography, when he is once set going, can take these as well as a highly-paid astronomer, hence the small outlay for which I know such records may be secured.
8. I trust the Government of India may be pleased to receive this suggestion with favour; should they do so, such a photographer can easily be found in India, where I know also there are many able and willing to set him fairly at his daily work.
9. But if any difficulty is anticipated on this score, and it be necessary to fall back on this country, then, if permitted, I will endeavour, free of all expense to the Indian Government, to obtain and train such a man, and indeed I have such a one already to my hand, my present assistant, Sapper Meins, who obtains his discharge shortly, and is willing to proceed to India for a period of two years.
10. Further, if considered desirable, I would willingly receive reports from him, and in this way test and control his work for the first two years while in India.
11. The accompanying memorandum from Major Donnelly also indicates that the reduction of the photographs (the working up of the raw material), which I would also, if desired, superintend, may possibly be secured without expense to the Indian Government.
12. Supposing such a series of photographs started, the stand of the photoheliograph might remain in India, and the tube only be transmitted to the Astronomer Royal after another had been sent out, which has already been examined for distortion of image.
13. The other instruments should certainly come home at once. If not contrary to Indian regulations, I would beg to be allowed the use of them for a limited period. I am authorised to state that they would be held in charge by the Science and Art Department, and would be most carefully looked after.
14. My remarks are longer than I intended; I hope this freedom may be forgiven. I know I am second to many in the value of the advice I can give, but I am second to none in the anxiety I feel for the progress of this work."

The suggestions made in this memorandum were accepted and shortly afterwards solar photographs were commenced at Dehra, where they have been continued for a period of nearly 20 years with splendid regularity and with the greatest benefit to our knowledge of the sun.

In 1889 the Secretary of State asked the Solar Physics Committee how the telescope and spectroscope then in the possession of the Indian Government should be employed. The Committee in reply suggested that the daily observation of the spectra of sun-spots should be taken in hand.

Another part of the action of the Government has depended upon the growing certainty that scientific inquiries must be imperialised to secure both efficiency and economy. The soundness of this view was established by the success of the Meteorological Department which was imperialised in 1874, Mr. Blanford being the first Director. This suggested then the imperialisation of the remaining observatories, not exclusively meteorological, and expanding them rather than establishing new and unconnected institutions.

At the same time it was felt that it was desirable to build a hill observatory, and preferably in Southern India, as a *succursale* to the existing institutions; and as far back as 1885 Mr. M. Smith was asked to report on the astronomical conditions of Kodaikanal. The death of Mr. Pogson, the Director of the Madras Observatory, in 1891 enabled the Government to take action from both these points of view, i. e., to suggest the imperialisation of the Madras Observatory and the transfer of part of it to a hill station. This was in 1892.

The scheme drawn up by Mr. Eliot, which was referred to both the Observatories Committee and the Solar Physics Committee, contemplated both an astronomical and solar physics observatory and was accepted by both Committees: the Solar Physics Committee, however, pointing out that in case of lack of funds it was desirable to begin with the solar physics observatory.

The Government of India did not see its way, I presume on financial grounds, to equip a complete institution and proposed the erection of a solar physics observatory only. This limitation was referred to the two Committees in 1893 and approved by both, the Observatories Committee stating that they approved of deferring for the present the decision as to the permanent site of the astronomical observatory.

On the 31st of August 1893 the Secretary of State sanctioned the proposal and authorised the necessary outlay. This was to be borne on the meteorological budget (Under Secretary, Government of India, R. and A., E. D. MacLagan, 8th November 1893). The new observatory was placed under Mr. Michie Smith who had succeeded Mr. Pogson as Director of the Madras Observatory in 1891.

With regard to the question of imperialisation, the Government of India asked the Government of Madras in 1893 (Secretary, Government of India, R. and A., E. C. Buck, 4th November 1893) if they agreed to the transfer and to placing the organisation and management of the thus expanded Madras Observatory under the Meteorological Reporter to the Government of India. The Government of Madras at once assented. (From Government of Madras to Secretary to the Government of India, R. and A., No. 941 Public., 21st November 1893).

The general observatory question was expanded and complicated in 1895, when in consequence of the death of Mr. Chambers, the Director of the Observatory of Bombay, the question of the imperialisation of that Observatory had to be considered. Opportunity was taken by Mr. Eliot, who again was called on to prepare a scheme, to point out the importance of the magnetic survey of India which, as I have elsewhere pointed out, was very early laid down in the scheme of work of the Bombay Observatory. This and the reduction of the Bombay magnetic observations were added to the duties of the new hill observatory, a special Director and staff being proposed to look after it. These proposals were submitted for consideration to the Director of the Geological Survey, the Surveyor-General, and Director of the Indian Marine, and after approval by all these authorities they were forwarded to and accepted by the Bombay Government, which also expressed its approval of the proposed imperialisation; but in agreeing to hand over the Observatory to the Government of India, they insisted that the continuity of the Bombay magnetic observations, of which they were justly proud, should not be broken.

I am informed that the Government of India accepted this view, is pledged to continue magnetic observations at Bombay, and has informed that Government that they have no desire to reduce the number of observations made.

SECTION 6.—REMARKS ON THE GOVERNMENT PROPOSALS.

Taking the facts and decisions referred to as they stand, it is clear that it is not the present intention of the Government of India to provide a large establishment for the study of the older astronomy, but rather to improve the existing observatories with their several needs, and, further, to utilise the Indian conditions to study the sun and the terrestrial phenomena which, in the opinion of many competent authorities, are associated with solar changes.

From the beginning the appeals made to the Government of India to further these objects have been based upon the idea that sooner or later results of practical importance to the inhabitants of India would arise.

On this point I need only quote here the opinions of Indian authorities, and I begin with the following from the Famine Commission Report published many years ago now:—

“On the whole it is not possible for us, in the present state of knowledge, to say more than that the subject of the periodicity of fluctuations in the rainfall, as determined by the sun-spot variation, is one deserving of careful investigation, and that it does not seem contrary to reasonable expectation that some relation should be established between the variations of the rainfall

from year to year and those of the conditions of the sun's surface, on the heat derived from which, unquestionably, all terrestrial meteorological phenomena closely depend. For various reasons India is a country in which the investigation of this matter may be carried out with especial facility, and for this reason (though other grounds are not wanting) we would urge that as the expenses of such researches would be small, the measures which have recently been taken by the Government of India to carry them out should be continued, and even extended in the future."

As early as 1878 the investigations of the Indian meteorologists brought this matter nearer home (Annual Report 1877).

"The following are the more important inferences that the meteorology of India in the years 1877 and 1878 appear to suggest, if not to establish. There is a tendency at the minimum sun-spot periods to prolonged excessive pressure over India to an unusual development of the winter rains and to the occurrence of abnormally heavy snowfall over the Himalayan region (to a greater extent probably in the western than the eastern Himalayas). This appears also to be usually accompanied by a weak south-west monsoon.

"The characteristics of a weak monsoon are, great irregularity in the distribution of the rainfall over the whole of India and the occurrence of heavy local rainfalls which tend by a law of rainfall and of air-motion to recur over the same limited areas. The irregularity of rainfall distribution is often shown by the persistent and prolonged absence of rain over considerable areas. These areas of drought and famine are partly marked off by nature, depending to a certain extent on the geographical features and position of the district. Thus the rains are more likely to fall below the amount necessary for cultivation in the dry region of the Deccan or in Upper India, than over the Malabar coast area, or in the province of Bengal. Geographical position is, however, not everything. It probably explains sufficiently the tendency to the recurrence of famines in certain areas. The primary causes must be sought for in the great atmospheric current which is the source of the rains. The tendency to the occurrence of high pressure and low temperature due to excessive winter rains in Upper India and snowfall in the Himalayan region, assigns an adequate cause for the accompanying variation in the strength of the south-west monsoon. And as the continuance of the south-west monsoon during the months of July, August and September is mainly, if not entirely, due to the indraught which accompanies the rainfall, a weak monsoon and therefore lighter rains than usual in the early stages necessarily produce a feebleness of indraught than usual. In other words, so far as this important factor influences the monsoon, if it is weak initially, it will be weak and feeble during the whole period. It is almost unnecessary to add that this has been amply confirmed by the experience of recent years. Hence the tendency at minimum sun-spot periods to the occurrence of excessive winter rains and snowfall in Northern India influences the meteorology of the whole of Northern India, giving rise to increased pressure, diminished temperature, etc., during the period immediately antecedent to the rains. The baric gradient of the south-west monsoon is smaller than usual at its commencement, and the monsoon is weak and feeble; a larger amount of the aqueous vapour is probably deposited over the sea area before it reaches India.

"In India the rainfall is more irregularly distributed than usual. The distribution of the rains in India itself is probably dependent upon the peculiar features of the local distribution of pressure. Local heavy rains over limited areas are accompanied by drought, partial or complete, over other areas. The probability of the occurrence of drought over any area depends partly upon the geographical position of the area, but mainly upon the antecedent abnormal atmospheric conditions, in so far as they modify the direction and strength of the lower atmospheric vapour-bearing currents."

I was anxious to learn from Mr. Eliot, who is at present in charge of Indian Meteorology, which is certainly the most important meteorological organisation in the world, and which, I believe, also covers the largest area, whether the experience of the last 20 years had caused him to recede from the opinion expressed as I have shown in 1878.

He was good enough to give me the following memorandum, with permission to print it here:—

"It appears to me certain, both from experience and theory, that there must be a direct relation between the variation in the distribution of the solar energy and the meteorology of the earth, and more especially of the tropical regions of the earth. The relation is probably not a simple one. It is now a fundamental principle in meteorology that the phenomena of terrestrial meteorology are directly or indirectly the results of the absorption and transformation of the energy of solar radiation by the atmosphere. It is hence evident that any large variation in the radiation of the sun (due to any cause) must give rise to corresponding variations in terrestrial meteorology. The experience of the last twenty years has shown fully that there are large cyclical variations in the annual distribution of rainfall in India to which it has not been possible as yet to assign a physical cause. The only hopeful direction of inquiry appears to me to be to ascertain whether these (and other similar) periodic variations in India are correlated with periodic changes in the sun. Hence the study of solar-physics is essential for progress in meteorology in India. It can be carried on under the most favourable conditions in India, and if a satisfactory solar-physics observatory were started the information would be immediately available for the information of the Meteorological Department, and hence, probably, lead to much more rapid progress than is at present possible in the science of meteorology, and its utilization for the purpose of seasonal forecasts, the most important problem with which the Indian meteorologist has at present to deal."

1st January 1898.

JOHN ELIOT.

The old arguments therefore have been strengthened by time.

I would beg permission in this place to point to the continuity of the intention and proposed action of the Indian authorities in attempting to provide gradually what they could not provide at once; and at the risk of appearing presumptuous, I would point out also how wise have been the steps proposed, not only to provide first what was wanted first, but to secure economy and improved administration over the whole field of observational activity. We have—

1. The idea that it was important to correlate solar with meteorological phenomena. This idea either originated with or was independently arrived at by the Indian authorities before 1871.

2. The starting of solar photographs in 1878.

3. The proposed starting of sun-spot spectrum observations in 1889.

4. The imperializing of observatories in 1891.

5. The approval of a hill observatory in 1893.

SECTION 7.—WHAT HAS HAPPENED TO THE GOVERNMENT PROPOSALS.

The various schemes for advancing solar physics, which, as I have shown have been under consideration from 1871 onwards, were by 1885 reduced to a single one having reference to the building of an observatory in Southern India. In the latter year, Kodaikanal was favourably reported on. In the next eight years the matter was carried a stage further; in November 1893 the Kodaikanal scheme was approved by the Secretary of State, the money granted and an organisation established, and everybody agreed to the imperialization.

But, so far as I can find, although now another period of five years has elapsed, nothing practically has been done. There has been no imperialization, practically no building, and not a single observation bearing on solar physics has been made beyond the photographs of the sun's surface commenced at Dehra in 1878.

The daily routine observations of the sun, including especially the observations of the spectra of sun-spots, the importance of which was pointed out in the Solar Physics Committee letters of 1889 and 1892, which might easily and cheaply have been undertaken at Madras pending the building of the Hill Observatory, are not even yet commenced.

In Mr. Eliot's recommendations, dated 4th March 1893, I find it stated that "the Secretary of State had requested that such observations should be initiated," Mr. M. Smith informs me that he has orders not to proceed with these observations.

There is evidently some conflict of authority, but on this point I have no information.

I must state, however, that money has been spent in preparing plans for the Observatory and a considerable sum has been expended in instruments. If a complete scheme of daily work had been drawn up by a competent authority in solar-physics, and the instruments necessary to carry out this programme had been obtained, this expenditure would have marked a real progress; but, unfortunately, I find no such scheme, and I can neither recommend the use of the instruments obtained nor the employment of the methods proposed. I shall give details on these points in another part of my Report; it must suffice here to emphasize the fact that the Secretary of State's letters of 1889 and 1892 are not yet acted on, and that the years lost will retard progress for half a generation, not only in our knowledge of the sun, but in the possible application of that knowledge to meteorology and all its Indian derivatives.

SECTION 8.—THE QUESTION OF ADMINISTRATION.

I pointed out in Section 3 how in the past the work of the observatories has suffered from the absence of co-ordination and control. It is to be hoped that advantage will be taken of the present inquiry to secure the benefit of improved administration for the future for all the observatories. An extension of the decision of the Government of India to place the Madras and Kodaikanal observatories on the budget, and under the supervision of the Meteorological Reporter to the Government of India, is, in my opinion, all that is wanted for this purpose when the others are imperialized. In this way only can all similar scientific work be correlated, and the maximum of output and the minimum of expenditure be secured. Experience has shown that it is unsound policy to treat the existing observatories as independent establishments.

The Meteorological Reporter is already in charge of 9 first class, 70 second class, 113 third class, and 5 fourth class meteorological observatories, and in some of these astronomical, actinometric, magnetic, and seismological work already goes on in connection with the general scheme of work. The generally accepted connection between sun-spots and magnetism, and the possible connection between solar changes and terrestrial meteorology, point to the importance of the association of the allied researches, and their being placed under one control. This being so, the decision of the Indian Government already referred to is obviously the right and proper one.

But, although the proposed new observations in solar-physics and magnetism are more allied to meteorology than to any other scientific work controlled by the Indian Government, I think it quite possible not only that much benefit might arise from consultation between the heads of the different scientific departments of the Government in relation to observatory matters, but that in certain cases officers of the Surveyor-General's and the Geological Departments might co-operate in the prosecution of some of the work of the magnetic survey, as the work of solar-physics is already actually aided at Dehra by the Survey Department. It is

quite obvious that, from the outset, the connection between the magnetic and geological surveys must be of the closest. I would suggest, therefore, that if the present decision of the Government is extended so that the Meteorological Reporter becomes *de facto* Director-General of Indian Observatories—

The Surveyor-General,
The Director of the Indian Marine,
The Director of the Geological Survey,

should be as far as possible consulted on the general and broad questions connected with the working of the Magnetic Survey Department, and that any assistance the Survey and Geological Departments could give towards carrying out the First Magnetic Survey should be as far as possible utilized.

Under such a scheme the Director-General would lay down schemes of work for each observatory, and would arrange for the discussion and reduction of the observations. To help him in these duties he should have power to refer direct to the Observatories Committee of the Royal Society on all questions of general administration, and to the Solar-Physics Committee of the Science and Art Department on all points specially relating to solar physics observations.

Mr. Eliot, in his memorandum on the proposed magnetic work, suggests (29th May 1896) that the Observatory of Bombay be placed under the Director of the magnetic branch of the future hill observatory.

I venture to suggest that, when once all the observatories are placed under the orders of a Director-General, it will be better that all the Directors should report to him. In this way a feeling of emulation encouraging work may take the place of a feeling of subordination discouraging it, and many questions unpleasant to deal with when once raised may never be raised at all.

But it is clear that if this new work be thrown upon the Meteorological Reporter he will require some additional assistance in the performance of his duties, and it is equally clear that the greater scientific responsibility thrown upon the Meteorological Reporter by the new arrangements and observations which give a greater, but not too great, breadth and dignity to meteorological inquiries and place them on a proper footing, will require that the future chief officers in the meteorological service of the Governments shall be men of wide scientific training.

This perhaps is the proper place to point out that the system at present adopted by the Indian Government of treating its scientific servants on a different principle from that adopted in other departments is really not conducive to the best interests of the State. The chief disadvantages under which scientific men now labour in India are want of promotion and of graded increases of salary throughout their service. Men of science are after all men, and are no more likely than others to work heartily without any hope of increased pay or advancement especially when they are reminded by the promotion and increased emoluments granted to those in other branches of the same state service of their own waterlogged condition. It is to be hoped that one result of the present inquiry will be to remedy a state of things which experience has shown is attended with obvious disadvantages.

The welding of the various kinds of observational work into one Department which I have recommended above, would, I believe, not only simplify and strengthen administration by enabling the Government of India to deal with a single officer under their orders; ensure greater economy and efficiency in the conduct of the work of the various branches; but permit of the formation of a Scientific Civil Service, graded as I have suggested and entailing no greater cost than that necessitated by the present unsatisfactory system.

SECTION 9.—THE ORGANISATION OF AN INDIAN SOLAR PHYSICS OBSERVATORY.

The daily presence of abundant raw material in the shape of sunshine must be the first point to be considered in an Indian solar observatory, and it suggests at once a daily registration of every solar change that is going on, because such work is impossible elsewhere. In acting on this principle India cannot only best help on science but supply her own meteorological needs. It is on every ground, therefore, most important to secure daily routine observations above all others and their value depends on their continuity.

The daily observations of the sun which it is necessary to secure, not only to compare with terrestrial relations (magnetism and meteorology), but to advance our knowledge of the sun, are briefly the following:—

- (1) Photographs of the sun's surface, showing spots, faculæ, etc.
- (2) Photographs of the sun and chromosphere in monochromatic light showing the relations of prominences to the spots and spot zones.
- (3) Eye observations and photographs of the most widened lines in sun spots.
- (4) Eye observations and photographs of the lines in the spectrum of the chromosphere.

To get anything like continuity in these observations, the experience of the last twenty years has shown that science is absolutely dependent upon tropical countries where sunshine can be depended upon each day.

1. Prior to the commencement of the daily photographic registration of the sun's surface at Dehra and the Mauritius, the number of days on which photographs were taken in a year at Greenwich (where observations were not then made on Sundays) has already been referred to,

page 13; since the taking up of the work in India and the Mauritius the yearly number has been carried up to 360 (*see* pp. 24-5).

2. The photographs of the sun in monochromatic light represent a new method of research. I have come to the conclusion that it is quite useless to attempt to employ it continuously at Kensington, as the record is too broken.

3. Although no opportunity has been lost at Kensington on every week day during the last 19 years of observing the most widened lines in sun spots, only about 2,000 observations have so far been accumulated, say in a period embracing roughly 6,000 days.

4. Daily eye observations of the lines in the spectrum of the chromosphere were commenced by the Italian observers and myself, but although their climate is more favourable for this work than the English one, it has been found undesirable to continue them.

The above facts will give some idea of the importance which must be attached to daily spectroscopic routine observations in India. We are justified in considering that the record of phenomena thus obtained will be as satisfactory as that already secured by daily photographs of the sun's surface by the co-operation of Greenwich, Dehra, and Mauritius

Apparatus for routine work 1.

This consists of a photoheliograph; one has been at work at Dehra for 20 years, and, as I show on page 25, should not be disturbed.

Apparatus for routine work 2.

The object of this routine work is, as I have already stated, to provide the spectroscopic complement of the daily photographs of the sun's surface taken at Dehra. By its means we obtain at the expenditure of a few minutes of time by photography a monochromatic image of the solar spots and prominences, both on the disc and at the limb. The method, though old in suggestion, is recent in its application, and certainly constitutes one of the most important means of helping on our knowledge of the various periods of solar change, and therefore of the physics of the sun generally. It is not necessary to refer in detail to the apparatus here as there are several forms.

Apparatus for routine work 3 and 4.

For this purpose an equatorial is necessary, with an attached spectroscope, of which the dispersion can be varied. The optical axis of the spectroscope must be capable of rotation, so as to be able to observe the chromosphere at any point of the sun's limb with either a tangential or radial slit. The necessary adjustments and motions are naturally somewhat complicated, and as it is essential that they should be made by the observer while the work is going on handles are led to the eye-piece of the spectroscope.

For such observations as those now in question considerable dispersion is necessary, hence a very bright solar image on the slit is essential. So long as this condition is maintained, of course, the larger the solar image is the better; but in practice it is found that the solar image produced by a 6-inch object glass of ordinary focal length is large enough to allow of the observation of both spots and prominences.

Special Researches.

In addition to the routine observations special researches should find a place in a first-class solar physics observatory. What these shall be must depend on the knowledge and skill of the Director; his knowledge, because without it he may lose time by attacking problems of small importance, or which are certain to lead to nothing; his skill, because each research may require some modification in the instrumental equipment or arrangement.

But it should certainly be a rule that no special research should be attempted until the routine work is completely provided for, and is carried on continuously and effectively day by day; and *à fortiori*, the buildings should not be designed with reference to special work and to the omission of all arrangements for the fundamental routine work.

SECTION 10.—THE PROPOSED SOLAR PHYSICS OBSERVATORY AT KODAIKANAL.

In stating the Government action in Section 6 I referred to the proposals (dating from at least as far back as 1871) to build a hill observatory, ending with the decision of the Secretary of State for India, in August 1893, that a solar physics observatory should be built at Kodaikanal and that the necessary funds should be provided and the work proceeded with at once.

I now proceed to give the results of my inquiries into the present state of this project. The observatory is not yet built, but when at Madras Mr. M. Smith showed me the proposed plans with the statement that they are still under revision. He promised to send me the final plans, but I have not yet received them.

In the provisional plans I found no provision whatever for the prosecution of the daily routine work to which I have referred, with the exception of the daily photographs of the sun which I have elsewhere recommended should, for the present at all events, be continued at Dehra.

Routine Work (2).

Arrangements for carrying out Daily Routine Observations (2) have been entirely neglected, so far as any special provision of instrumental equipment or observatory accommodation at

Kodaikanal is concerned. But as a matter of fact no very special apparatus is required, but rather the utilization of small telescopes, etc., which exist in most observatories.

I pointed out this serious omission to Mr. M. Smith when at Madras, and gave him a sketch of an easily constructed form of apparatus with which the work could be at once commenced at Madras, in order to study the best methods to employ and gain experience.

So satisfied am I that there is no more important solar work to be done in India than this, that on leaving Madras I wrote the following letter to Mr. Eliot, urging the commencement of this work at once at Madras:—

Madras,

18th February 1898.

My dear Eliot,

I cannot leave Madras without saying how very strongly I feel that, after all this disastrous delay in getting the solar physics observations under way which were approved some years ago, the situation may to a certain extent be saved for the future with a slight expenditure.

The expenditure, as I understand it, will not be an excess on any estimates, because the staff for the Solar Physics Observatory approved four years ago has not been appointed, and so their pay has been saved.

My suggestion is, that daily spectrum photoheliograph pictures of the sun on the Jannsen-Hale-Deslandres system should be begun at once at Madras in a shanty, the erection of which would be a matter of a few days and pounds, and the affording assistance to Mr. M. Smith, who tells me he is prevented by his orders from undertaking such work himself at the present time. The photographs will require about ten minutes a day when the apparatus is in working order.

I have explained the method of working to Mr. M. Smith, and I fancy he has already instruments which would enable him to begin at once.

I should be much obliged if you will urge this upon Mr. Michie Smith (whom I shall not again have the opportunity of seeing) in the hope that he may take any action necessary to enable him to start these observations as early as possible. I shall be glad if you will give him a copy of this letter if he thinks it will be of any service in the matter.

Sincerely yours,

(Signed) J. NORMAN, LOCKYER.

Routine Work (3) and (4).

The Indian Government was in possession of all the apparatus needful for the prosecution of inquiries 3 and 4 between the years 1879 and 1895. The combined instrument was first tested, and the best dispersion for observing the most widened lines in sun-spots and the bright lines in the chromosphere determined at Kensington, where it was used in the series of observations from 1879 onwards.

After this instrument had been adjusted and used for some time, it was sent in 1885, by the desire of the Indian Government, to Poona to continue this class of observation in India, the importance of which was re-affirmed by the Solar Physics Committee in 1889.* It was, however, not used there until 1892. After use there for two years the Indian Government in 1894 ordered its transfer to Madras.

No work has been done with it there, but the instrument has been destroyed at an expense of 65/., under guise of reconstruction. A "new spectrograph" bought at an expense of 250/., is quite useless for the purposes of the daily observations either of widened lines in spots, or of the bright lines of the chromosphere. The Indian Government, therefore, is at the present time without an instrument to carry on the observations which the Secretary of State requested should be initiated in 1893.

To make them it will be necessary to provide a new spectroscope with power of rotation and the various adjustments to which I have referred, and attach it to the 6-inch Cooke, thereby bringing us back to the conditions of 1879.

It will be gathered, therefore, that, with the exception of the photoheliograph, the Indian Government is not in possession of instruments fitted for the routine work to which I have referred. It is natural to suppose, therefore, that the plans of the new Observatory do not provide for this work, and this I found to be the case with the provisional plans I inspected when at Madras. I now proceed to consider them.

The Plans of the new Observatory.

In my opinion the proposed plans require considerable alteration before they are carried out. They do not provide for all the essentials, and the non-essentials are not provided for in the best way.

I recommend, therefore, that the plans should be revised so as to provide for the reception of the instruments necessary for the daily routine work of 2, 3, and 4.

At the same time I wish to express my strong opinion, seeing that the observations have already been delayed several years, that the further possible delay may be prevented by putting up, either at Madras or Kodaikanal, temporary sheds in which the work may be commenced at once.

It is important to point out that the Observatories Committee when they agreed to the postponement of the question of a General Astronomical Observatory, had in their minds the experience as to observing conditions, which would be gained at Kodaikanal when the station had been occupied for some time. This was in 1893.

But no experience has been gained because no continuous observations extending even over one year have been made; the matter stands, therefore, exactly as it did in 1893.

The Solar Physics Committee, in its letter to the India Office in 1892, pointed out the possibility, and I now add, after 20 years' experience, the *desirability* of commencing such work as this in inexpensive, temporary, detached buildings, which not only accumulate no heat and permit a free circulation of air, but can be easily and cheaply altered if the actual work shows alteration to be desirable.

I suggest, therefore, that the erection of the permanent buildings to cover the instruments, with the exception of the two domes, be postponed until the final plans have been approved by the Observatories and Solar Physics Committees. The plans were still under revision when I was at Madras. The sooner the routine spectroscopic work is commenced at Madras, in inexpensive temporary sheds, the more experience will be gained.

After, say, a year's regular daily routine observations have been made at Kodaikanal, the question of the Astronomical Observatory there can then, if the Indian authorities wish it, be considered in the light of the experience gained by the solar observations.

If Mr. M. Smith, in consequence of his orders, or for any other reason, cannot commence the routine solar physics work, the initiation of which was ordered by the Secretary of State in 1893, I would recommend that a competent observer be sent from this country to carry on the work until it can be proceeded with on the lines laid down by the Secretary of State. This would not be an expensive arrangement, and I have little doubt that one of the assistants employed in the Solar Physics Observatory at South Kensington, if leave could be obtained, would be willing to go to India for a brief period to set up the instruments in temporary sheds and commence the observations. As already pointed out, a new spectroscope would be required to replace the one rendered useless for routine work (3) and (4); the instrument required for (2) would, I think, not cost more than, say, 150%.

In this way a start would have been made, and the disastrous delay brought to an end.

SECTION 11—THE PROPOSED MAGNETIC SURVEY.

The proposal to erect a Solar Physics Observatory at a hill station, as I have shown, dates from many years back. When the proposed imperialization of the Observatory of Bombay was reported on by Mr. Eliot, he suggested that the reduction and discussion of the Bombay observations should be carried on also at a hill station, and Kodaikanal was suggested, on the ground that, were this arrangement carried out, the daily observations at Bombay might be superintended by a half-time officer, and that the whole-time officer at Kodaikanal might, during the cool season, go on with the magnetic survey of India, which, though inserted early in the Bombay programme, had been consistently neglected.

The development of magnetic observations at Alipore, where in a few months' time a first-class magnetic observatory will be in working order, renders it all the more necessary to establish a system which will facilitate and hasten the publication of magnetic results wherever obtained. It appears to me that Mr. Eliot's suggestion is a very wise one, especially in reference to the Indian conditions of work; and I have elsewhere shown that the magnetic survey should form part of the general observatory organization, although it probably will be found possible that the survey operations in certain regions may be helped by taking advantage of the presence of officers, either of the Surveyor-General's or the Geological Departments in these regions, provided always that enough travelling instruments be available.

I have heard it suggested that the work of the magnetic survey might be carried on efficiently and economically by entrusting it entirely to the Surveyor-General, but I think there are great objections to this view. If the survey is to be conducted rapidly, he would certainly require a suitable addition to the existing staff of the Survey Department, unless it be at present over-manned, which is extremely improbable, and, in any case, the Observatory work at Bombay and Alipore should be reduced and discussed by the Director of the Magnetic Survey, whoever he may be. This scheme therefore would involve the transfer of the magnetic departments of the Observatories of Alipore and Bombay to the Surveyor-General, a responsibility from which I should imagine he would shrink, and a proceeding which, if carried out, would intensify the existing chaos in observatory organization.

I have heard of still another objection, and that is that there will be two Directors at Kodaikanal, and that this is contrary to good administration. I have not seen the site (as I was informed by the Under Secretary of State that it was not necessary for me to see it as so little had been done on it), but I understand that the conditions of the ground are such, that the dwellings of the magnetic staff consisting of the Director and three assistants and two peons cannot form part of the building of the solar physics observatory. There must therefore be two separate buildings at Kodaikanal, and I do not see why there should not be two separate Directors, and two separate organizations. Solar physics and magnetism are such distinct sciences that it will not be surprising to find that a master in one branch of the work will be a mere tyro in the other; it will, therefore, be impossible for him to conduct it properly.

But if the disadvantages of the proposal outweigh the conveniences I do not see why the magnetic Director should not be located at Simla, and, indeed, he might be practically nearer his work there.

SECTION 12.—INDIAN STANDARD TIME.

In Section 4 I have suggested that at Bombay and Alipore additional time signals should be given indicating respectively the mean time of the 75th and 90th meridians of longitude east of Greenwich.

I have done this because it is certain that at no distant date India will conform to the time arrangements now adopted almost universally by the civilized world. The difficulties in India are no greater than those already met in Europe, America, and Australia, while experience has shewn that the gain in simplicity of telegraphic and railway communications, etc., greatly outweighs them.

J. NORMAN LOCKYER.

5th May 1898.

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[Pros. No. 4

No. 2.] Telegram No. 2818, dated the 15th October 1898.

Serial No. 14.

From—Simla,

To—Madras.

From—Revenue Secretary,

To—Chief Secretary.

A Pros.,
July 1897,
Nos. 7 to 14.
(F. 9.)

WITH reference to my letter 1490, dated 1st June last, regarding Kodai-
kanal Observatory, Government of India agree that construction of observatory
buildings should continue and that early completion is desirable.

No. 3.] No. 3198—9-15, dated Simla, the 18th November 1898.

Serial No. 15.

From—E. MACONCHIE, Esq., Under-Secretary to the Government of India,

To—The Meteorological Reporter to the Government of India.

A Pros.,
Jan. 1898.
Nos. 34 to
3.
4(F. 8 of
1897.)

WITH reference to the correspondence ending with Mr. Sly's letter
No. 3778—68-11, dated the 30th December 1897, I am directed to forward a
copy of a Despatch from Her Majesty's Secretary of State for India, No. 173
(Revenue), dated the 22nd September 1898, and enclosure, regarding the reorga-
nisation of Indian observatories, and to request that the Government of India
may be favoured with your views on the subject.

No. 4.] No. 757 S., dated Simla, the 29th November 1898.

Serial No. 16.

From—J. ELIOT, Esq., Meteorological Reporter to the Government of India,

To—The Secretary to the Government of India.

I HAVE the honour to acknowledge the receipt of copy of a Despatch No. 173 (Revenue),
dated the 22nd September 1898, and enclosures, forwarded with your letter No. 3198—9-15,
dated the 18th November 1898, and in reply to your request to favour the Government of
India with my views on the subject, submit the following for the consideration of Govern-
ment.

I deal with the various points raised by these documents, more especially the recommenda-
tions of the Observatories Committee.

2. (a) *The establishment of an astronomical observatory as part of the complete equip-
ment of Kodaikanal.*—This is chiefly desired by the Astronomer Royal for general purposes
and by the Surveyor General for certain observations for the determination of the shift of the
earth's polar axis.

The *immediate* establishment of the astronomical observatory does not appear to me neces-
sary and is not recommended by the Observatories Committee. This suggestion (*i.e.*, the
early establishment of an astronomical observatory at Kodaikanal as part of the complete
observatory) was considered some time ago when it was decided both by the Secretary of
State and Government of India that the question of the establishment of the astronomical
observatory should, for financial reasons chiefly, be postponed for some years and be deferred
until the more urgently required Solar Physics observatory had been fully started. This
decision was accepted by the Solar Physics Committee and the then Observatories Committee.
Hence the present recommendation of the Observatories Committee may, I think, be treated
as academic for the present and its practical consideration be postponed for some years.

3. With respect to the necessity for a series of astronomical observations in India to
determine the slight movement of the polar axis of the earth, the Surveyor General will, I pre-
sume, give reasons. The movement is one common to and affecting the whole earth. Its
determination is as necessary for the Trigonometrical Surveys which have been carried out in
European countries as in India, and it has been under investigation for some years, I believe,
by German astronomers. So far as I can judge, the results obtained by the observations of
European astronomers should suffice to give ample data from which its effect in varying
latitudes and longitudes in India might be ascertained. And any determination in India, if
it agreed with their results, would only be confirmatory, and if it disagreed would probably
not be accepted.

4. If however the Surveyor General of India considers that a special investigation and
determination is necessary for his Departmental work, a much simpler and more economical
plan than the immediate establishment of a fully equipped astronomical observatory at
Kodaikanal would, I believe, be for that Department to carry out that investigation as a
special piece of work. The Survey Department has carried out the Tidal Survey and is pre-
pared to carry out the Magnetic Survey, and could hence probably have no difficulty in carry-
ing out this astronomical investigation. An officer of the Survey with the necessary qualifica-
tions could be deputed to visit the observatories in England or the Continent in which this
matter is under investigation, study the methods in use, ascertain all the details necessary for

**PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, MARCH, 1899.**

Pros. No. 4]

Reorganisation of Indian Scientific Observatories.

accuracy in these special observations and learn the best type of instruments requisite for the work. On his return the Surveyor General could provide him with the necessary instruments and special staff and locate him wherever he thought the work could be best carried out from his point of view, as for example at Dehra Dun, Poona, Bangalore, Calcutta or Madras, at each of which stations it would be much less costly to provide the temporary buildings and arrangements required for this short series of special observations than at Kodaikanal.

5. (b) *The early commencement of work at the Solar Physics Observatory at Kodaikanal.*—All the authorities consulted are at one as to the importance of the solar physics observations. The conditions in India for these observations are far more favourable than anywhere in Europe, and India can hence assist most effectively for general scientific purposes in all enquiries concerning solar physics. As these observations have a most important bearing on the meteorology of India, more especially the variations in the monsoon rainfall from year to year and similar questions, they have a practical value and importance which neither purely astronomical or even magnetic observations have. The establishment and equipment of the Solar Physics Observatory should hence be proceeded with as rapidly as possible and the suggestions of the Observatories Committee under this head should be adopted and given effect to. These are—

- (i) the provision of a new spectroscope, as recommended by the Astronomer Royal and Sir Norman Lockyer, which should be purchased *without delay*;
- (ii) the provision of an instrument for obtaining photographs of the sun in monochromatic light.

Mr. Michie Smith should be asked to submit an estimate for these instruments, and an urgent indent be sent to the Secretary of State for sanction to purchase them.

6. The Committee also recommend that the taking of the daily photographs of the sun should be continued at Dehra Dun for five years at least. The reasons for this will be found in Sir Norman Lockyer's report, pages 24 and 25, and are so strong that I think the Government of India should accept the suggestion, although this will increase the expenditure at Kodaikanal during that period, as the savings to be effected by the closure of the solar photographic work at Dehra will not be available during that period.

7. The estimated savings (*vide* schedule 1 to the Revenue and Agricultural Department Despatch No. 37 of the 20th June 1893) were Rs171-12-0 per mensem or Rs2,061 per annum, and hence the carrying out of this suggestion involves an increase of expenditure of Rs2,061 per annum during the next five years on that originally proposed by me.

8. It would probably be desirable that Mr. Michie Smith should draw up in about six months' time, when the Solar Physics observatory will be approaching completion, a general programme of his work for the consideration and approval of the Observatories Committee. In this he would state the various lines of work he proposes to take up, the instruments to be used, and the methods of dealing with the observations. This might be termed his official programme and the carrying out of this would of course not prevent his taking up afterwards other investigations suggested by his experience and supplementary to it.

9. (c) *The Magnetic Survey of India.*—The various authorities consulted agree as to the necessity and importance of this survey and accept generally the proposals of the Government of India. The Astronomer Royal suggests it should be carried out by the Survey of India, whilst Sir Norman Lockyer proposes it should be conducted by a specialist under the general control of the Meteorological Reporter. The Observatories Committee strongly approve of the proposed survey and forward a memorandum by Professor Rücker on the conditions which should be fulfilled in order to carry it out most successfully. They also add that it should be under the general direction of a Superintendent having special knowledge of terrestrial magnetism. Professor Rücker's minute should be accepted for our guidance. The most important points in it which require present consideration are:—

1st—that the fundamental survey should be carried out in as short a time as possible;

2nd—that the work should be carried out systematically as an independent piece of work, the plan of which should be drawn up before work is begun.

10. In order to carry out the valuable suggestions of the Observatories Committee and of Professor Rücker, it is necessary that a specialist having the requisite qualifications in mathematics and science and having also practical experience in the instruments employed in magnetic observatories and in the discussion of magnetic observations should be first appointed. The proper method to do so would be to ask the Observatories Committee through the Secretary of State to select a specialist for the work. He should be engaged for a definite period, say for five or ten years. The first duty of the Director of Magnetic Surveys on his arrival in India would be to study the conditions of work in India and draw up a scheme for carrying out the Magnetic Survey on the lines laid down in Professor Rücker's note. These should be sent to the Observatories Committee for their opinion and general approval.

11. In order that the fundamental survey might be carried out in as short a time as possible, it will be necessary to employ a considerable number of surveyors able to make the necessary observations with as great accuracy as possible. The suggestion has been made that the Survey of India could supply a number of surveyors for a short period of the

A Pros.,
June 1893,
Nos. 10 to
15.
(F. 14.)

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, MARCH, 1899.

Reorganisation of Indian Scientific Observatories.

[Pros. No. 4

stamp required. This would undoubtedly be the most economical and effective arrangement and should, if possible, be adopted. These surveyors will have to be placed under the direct orders of the Director of the Magnetic Survey for the time being.

12. (d) *The control of the scientific observatories in India.*—The control of the scientific observatories in India is (1) administrative, (2) scientific. The imperialization of these observatories has been sanctioned and should be carried without further delay. When this has been done the administrative control will be in the hands of the Revenue and Agricultural Department of the Government of India. The scientific control should, so far as possible, be placed in the Observatories Committee which has been recently extended and converted into a committee of the Royal Society.

The work should be carried out by Directors, specialists of the highest qualifications, general as well as special, for the work. This is even more necessary in India than in Europe as the subordinate staff in a scientific observatory in India is necessarily much less capable than in Europe and its efficiency depends chiefly upon the zeal of the Director and his personal influence on the staff. The Directors would, under the general scientific control of the Observatories Committee, be assured of sympathetic co-operation and guidance. They would, I am confident, be prepared to carry out all suggestions for their work from a Committee of its high scientific authority without friction or hesitation. Hence not only should each of the Directors at Kodaikanal submit an annual report of their scientific work to the Observatories Committee of the Royal Society but all important questions respecting the instrumental equipment of any of the observatories, and of their schemes of work should be submitted to that Committee for opinion before any action is taken.

13. An annual inspection of these observatories would be desirable for the information of the Government of India as well as of the Observatories Committee. The recommendation of the Committee "That a small board of visitors, composed of a few scientific officials selected by the Indian Government, make an annual inspection of the Indian observatories and report to the Indian Government on their condition and administration" should be adopted. The scientific officers in India most interested in the work of these observatories are—

- (1) Officers of the Survey of India Department.
- (2) The Director, Geological Survey.
- (3) The Director, Indian Marine Survey.
- (4) The Meteorological Reporter to the Government of India;

and perhaps the Government of India should appoint a committee of, say, five members and should arrange for an inspection of the observatories at Madras, Colaba and Kodaikanal annually by not less than three of the members. They should report the results of their inspection briefly to the Government of India as soon after each inspection as convenient.

14. It would also probably be necessary that the Revenue and Agricultural Department should select some scientific officers whom they could consult on any questions connected with the administration of those observatories and the carrying out of the programme of work on the lines laid down by the Observatories Committee. The Meteorological Reporter to the Government of India has advised in such matters in a somewhat tentative and informal manner during the past three or four years. It is a question that should be settled by the Revenue and Agricultural Department in the way most convenient to itself which will secure the most satisfactory results. There are two proposals under this head in the documents—

1st.—To place these observatories under the Meteorological Reporter to the Government of India, and change his title to that of Director General of Scientific Observatories in India.

2nd.—To place the Colaba, Madras and Kodaikanal Observatories under the Survey of India.

15. The latter would have several advantages, more especially during the period for which the assistance of the Survey of India is practically indispensable to carry out the first and most important part of the work of Magnetic Survey. The Surveyor General will doubtless place before Government the advantages of this work being handed over to an officer selected from the large permanent department of the Survey of India officered from the scientific service of the Army.

16. It is however due to the Meteorological Department that I should point out the advantages to that Department and to the science it represents if the present arrangement should be continued and formally sanctioned.

17. In my opinion and this I can say, I hope, near the termination of my service without laying myself open to the charge of personal or departmental bias, the Meteorological Survey of India is the one of the most important of its surveys. It has the widest and most practical bearing of all. It began by the use of purely empirical methods and has passed under Mr. Blanford and myself to the use of accurate statistical methods. The problems it presents in India are much simpler and more massive than in the temperate regions of the world. They are chiefly problems of hydrodynamics and thermodynamics and hence admit of mathematical treatment. My work during the past ten years has shown

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, MARCH, 1899.

Pros. No. 4] Reorganisation of Indian Scientific Observatories.

more and more conclusively that India is not, as was once imagined, meteorologically a self-contained area, but that its larger meteorological changes and seasonal variations are more or less dependent upon conditions outside India, notably in Central Asia, the Persian area and the Indian Ocean. It is moreover possible that the larger periodic and non-periodic variations may depend on changes in the sun or on solar or terrestrial electric or magnetic conditions or phenomena. I hence venture to suggest that the Meteorological Reporter of the future should be an officer of the highest and widest scientific and mathematical attainments. Meteorological enquiry is one in which India is pre-eminently interested, practically and economically. It is the one country in which meteorological investigation can be carried out most successfully. Its physical advantages in this respect are as great as for the work of solar observation. The results of investigations of solar physics and of terrestrial magnetism belong more directly to the science and sphere of meteorology than to those of the Survey of India. The inclusion of the scientific observatories under the control of the Meteorological Reporter will improve his status and increase his prestige. The Survey of India has the prestige natural to its connection with the army, to its numbers, to its important work in the past, and needs no extension of its field of work to increase its value and prestige. If the placing of these observatories under the control of the Meteorological Reporter should secure in future the appointment of officers of the highest mathematical and scientific attainments, versed not merely in meteorological enquiry but acquainted by experience with observational work in Electricity, Magnetism and Solar Physics, it would, I believe, lead to even more rapid progress than hitherto in the one science in which practically the whole of India is directly or indirectly interested, *viz.*, that of meteorology. Hence I venture to hope that the Government of India will take these opinions and views into consideration, as its decision will not only affect the status of its Meteorological Reporter in the future but probably largely modify and determine the progress of the science and practice of meteorology in India.

No. 5.] Telegram, dated the 9th December 1898.

Serial No. 17.

<i>From—Simla,</i>	|	<i>To—Calcutta.</i>
<i>From—Meteorological Reporter,</i>	|	<i>To—Revenue Secretary.</i>

If you think meeting of Committee on Observatories question likely to come off before 20th, I propose to leave here on 13th so as to dispose of budget estimates for scientific observatories and other urgent matters as early as possible.

No. 6.] Telegram, No. 3397—9-18, dated the 12th December 1898.

Serial No. 18.

<i>From—Calcutta,</i>	|	<i>To—Simla.</i>
<i>From—Revenue Secretary,</i>	|	<i>To—Meteorological Reporter.</i>

OBSERVATORIES Committee will meet on Monday 19th at 12 o'clock.

GOVERNMENT OF INDIA.

DEPARTMENT OF REVENUE AND AGRICULTURE.

METEOROLOGY.

To

THE RIGHT HONOURABLE LORD GEORGE F. HAMILTON,
Her Majesty's Secretary of State for India.

Calcutta, the 2nd February 1899.

MY LORD,

WITH Your Lordship's Despatch No. 173 (Revenue), dated 22nd September 1898, we received a copy of reports by the Astronomer Royal and Sir J. Norman Lockyer and of a letter and enclosure from the Royal Society in reference to the proposed reorganization of Indian Observatories. We would ask Your Lordship to communicate our acknowledgments to those gentlemen and to the Royal Society for the valuable assistance which they have given to our Government.

2. We now forward, for Your Lordship's information, a copy of a report by Mr. John Eliot, the head of our Meteorological Department and our principal scientific adviser, on the matters discussed in the papers under reference, and of the proceedings of a departmental Committee to which we submitted them for further consideration.

3. Subject to Your Lordship's approval, we propose to accept and act on the recommendations (1) to (9) of the Committee and on the first portion of recommendation (10). The second portion of the last recommendation is in accordance with our general views, but will not come under actual consideration until Mr. Eliot's retirement. The Committee's recommendations provide for the carrying out through the agency of the Survey of India within two or three years of the fundamental magnetic survey of the Indian Continent recommended by Professor Rücker. This survey will be undertaken as part of the operations of the Survey Department, and will be controlled by an officer of that Department. It may be necessary to arrange that the officer selected should undergo a short training in England before the survey is started; but on this point we await the recommendations of the Surveyor General. We agree with the Committee that until the completion of the fundamental survey, so much of the scheme submitted by us in 1897 to Your Lordship for organizing the Kodaikanal Observatory as provides for the appointment of a Director of Magnetic Surveys and appropriate staff, should be held in abeyance.

4. We also agree with the Committee that our work at Kodaikanal should for the present be restricted to the Solar Physics Observatory which is now in course of completion. We have authorized the officer (Mr. Michie Smith), who has hitherto held the post of Madras Astronomer, to assume the duties of Director of the Solar Physics Observatory at Kodaikanal, and we have decided to give immediate effect to the scheme of reorganization for the Madras Observatory and the Kodaikanal Solar Physics Observatory proposed in paragraph 48 of Mr. Eliot's letter No. 410 S., dated 29th May 1896, which formed an enclosure to our Despatch No. 56, dated 1st September 1897. This

A. Proc., Nov.
 1898, Nos. 1
 to 7.
 F. 11.

A. Proc., Sept.
 1897, Nos. 1
 to 3.
 F. 11 of 1896.

A Pros., Dec.
1893, Nos. 1
to 7.
F. 14.

A Pros., Jan.
1898, Nos. 34
to 43.
F. 68 of 1897

A Pros., Jun.
1897, No. 1.
F. 12.

scheme is identical in cost with that sanctioned in Lord Kimberley's Despatch No. 117, dated 31st August 1893, and merely makes certain changes in the subordinate establishment. We also propose to grant from the 1st April next to Miss Pogson, the Meteorological Reporter to the Madras Government, the pension sanctioned in Your Lordship's Despatch No. 193, dated 4th November 1897, and to readjust the office hitherto held by her in the manner explained in paragraphs 52 and 53 of Mr. Eliot's letter above referred to.

5. With regard to the Colaba Observatory, we propose during the next two or three years to maintain its establishment as it is at present. The arrangement sanctioned in Your Lordship's Despatch No. 69, dated 6th May 1897, under which Mr. N. A. Moos receives a salary of Rs500 per mensem while holding the sub. *pro tem.* appointment of Director, may be conveniently continued. But from the 1st April next we propose to bring the Colaba Observatory under the administrative control of the Meteorological Reporter to the Government of India.

6. The financial effect of our present proposals, as summarized in paragraphs 4 and 5 of this Despatch, is shown in the tabular statement appended. The cost of the fundamental survey is excluded, as it is difficult to estimate apart from the regular operations of the Survey Department.

7. We would request Your Lordship to obtain from the Royal Society the information which, in paragraph 4 of their proceedings, our departmental Committee consider to be required in respect of the proposed Astronomical Observatory at Kodaikanal. The establishment of such an observatory two or three years hence will be dependent on financial considerations, and also on the cost of the arrangements which may be made for future maintenance of the Magnetic Survey.

8. We accept the conclusion recorded in paragraph 8 of the Committee's proceedings that an annual inspection of the Indian Observatories by a small board of visitors is not feasible in India. It would withdraw officers from other important work which fully occupies their time, and it would not, in our opinion, result in equivalent advantages. The observatories will from time to time be visited on convenient occasions by our Meteorological Reporter and by the Surveyor General while these officers are on tour. We anticipate much benefit from the submission of the annual reports of the Kodaikanal Observatory and of the Officer in charge of the Magnetic Survey to the Observatories Committee of the Royal Society, and from the assistance which we trust the Observatories Committee will give us in the settlement of definite programmes of work. We approve the recommendation made by Mr. Eliot in paragraph 8 of his letter that a programme for the Solar Physics Observatory be prepared and submitted to the Observatories Committee.

We have the honour to be,

MY LORD,

Your Lordship's most obedient and humble Servants,

CURZON OF KEDLESTON.

W. S. A. LOCKHART.

J. WESTLAND.

M. D. CHALMERS.

E. H. H. COLLEN.

A. C. TREVOR.

C. M. RIVAZ.

No. 435—9-19.

COPY, and enclosures, with a copy of the paper noted in the margin, forwarded to the Finance Department for Despatch from the Secretary of State, No. 173, dated 22nd September 1898, and enclosures. information in continuation of endorsement No. 115—68-14, dated the 13th January 1898.

No. 436—9-19.

COPY, with a copy of the papers noted in the margin, forwarded to the Meteorological Reporter to the Government of India with reference to the correspondence ending with his letter No. 757-S., dated the 29th November 1898.

(1) Proceedings of a Departmental Committee, dated Calcutta, 19th December 1898.

(2) Statement showing the financial effect of the proposed reorganization of Indian observatories.

By order,

E. MACONCHIE,

Under-Secretary to the Government of India.

List of Enclosures.

1. Letter from the Meteorological Reporter to the Government of India, No. 757-S., dated the 29th November 1898.
2. Proceedings of a Departmental Committee, dated Calcutta, 19th December 1898.
3. Statement shewing the financial effect of the proposed reorganization of Indian observatories.

FILE No. 9 OF 1898.

SERIAL No. 19.

No.

1899.

GOVERNMENT OF INDIA.

Department of Revenue & Agriculture.

METEOROLOGY.

No. 14, DATED CALCUTTA, THE 2ND FEBRUARY 1899.

(C O P Y .)

(*Letter to Her Majesty's Secretary of State
for India.*)

SUBJECT.

REORGANIZATION of Indian Scientific Observatories.

PRESENT :

The Hon'ble SIE JAMES WESTLAND, K.C.S.I.

„ „ MB. C. M. RIVAZ, C.S.I.

T. W. HOLDERNESS, Esq., C.S.I., *Secy. to the Government of India,
Department of Revenue and Agriculture.*

Major-General C. STRAHAN, R.E., *Surveyor General of India.*

J. ELIOT, Esq., C.I.E., F.R.S., *Meteorological Reporter to the
Govt. of India.*

1. That the fundamental magnetic survey of the Indian continent should be undertaken by the Survey of India, and that for the present, until the fundamental survey which is likely to last for two or three years is completed, the question of the appointment of a specialist from Europe as Director of Magnetic Survey is not one that presses for immediate decision. On the completion of the fundamental survey, the question of the future of the survey and of the discussion of the results will have to be considered.

2. That until the fundamental survey be completed the Colaba Observatory be maintained on the present scale.

3. That for the present the efforts of the Government of India be directed at Kodaikanal to the completion of the Solar Physics Observatory, and that the question of the establishment at Kodaikanal of an Astronomical Observatory be taken up hereafter along with the question of the appointment of the Director of Magnetic Surveys.

4. That meanwhile the Observatories Committee of the Royal Society be requested to advise as to the equipment, staff, organization and scheme of observations of the proposed Astronomical Observatory at Kodaikanal, and that when this information has been obtained, a site be selected and plans and estimates for the proposed buildings framed.

5. (a) That with reference to paragraph 3 of the Royal Society's letter the Director of Solar Physics (Mr. Michie Smith) be asked for an estimate of his requirements.

(b) That the Survey of India continue the daily photographs of the sun at Dehra at least for five years.

6. That with reference to paragraph 4 of the letter the Surveyor General be asked to report on the proposal for the establishment of a permanent magnetic observatory for eye observations at Dehra.

7. That with reference to paragraph 5 the Surveyor General be asked to report as to how he proposes to arrange for the superintendence of the fundamental survey.

8. That with reference to paragraph 6 it is agreed that the proposal for a annual inspection by a small board of visitors is not feasible in India.

9. That paragraph 7 be complied with by the Director of the Solar Physics Observatory and by the officer placed in charge of the proposed magnetic survey.

10. That the Director of the Solar Physics Observatory for the present be placed for administrative purposes under the Meteorological Reporter to the Government of India: and that eventually there should be a scientific adviser to the Government of India, who should be a man of established European reputation and who should occupy the position of Director General over the Meteorological, Solar Physics, Astronomical and Magnetic Branches of all Indian Observatories.

Statement showing the financial effect of the proposed reorganization of Indian Observatories.

	Sanctioned.	Proposed in 1897.	Now proposed.
	<i>R a. p.</i>	<i>R a. p.</i>	<i>R a. p.</i>
Solar Physics Establishment . .	1,451 4 0	1,499 4 0	1,499 4 0
Madras Observatory . . .	380 0 0	332 0 0	332 0 0
Madras Meteorological Office . .	1,043 12 0	524 12 0	524 12 0
Pension to Miss Pogson . . .	<i>Nil.</i>	250 0 0	250 0 0
Colaba Observatory	987 0 0	507 0 0	987 0 0
Magnetic Survey	<i>Nil.</i>	1,030 0 0	<i>Nil.</i>
TOTAL .	3,862 0 0	4,143 0 0	3,593 0 0

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, MARCH, 1899.

Reorganisation of Indian Scientific Observatories.

[Pros. No. 8]

No. 8.]

No. 468—9-20, dated Calcutta, the 13th February 1899.

Serial No. 20.

*From—E. MACONOCHE, Esq., Under-Secretary to the Government of India,
To—The Surveyor General of India.*

A Pros.,
Jan. 1898,
Nos. 34 to 43.
F. 68 of 1897.

WITH reference to the correspondence ending with Mr. Sly's letter No. 3780—68-13, dated 30th December 1897, I am directed to forward a copy of the papers noted in the margin regarding the proposed reorganisation of Indian observatories, and to request that the Government of India may be informed of the arrangements you propose for the conduct of the proposed fundamental Magnetic Survey.

1. Despatch from Her Majesty's Secretary of State for India, No. 173, dated 22nd September 1898, and enclosures.

2. Despatch to Her Majesty's Secretary of State for India, No. 14, dated 2nd February 1899, and enclosure No. 2.

of the papers noted in the margin regarding the proposed reorganisation of Indian observatories, and to request that the Government of India may be informed of the arrangements you propose for the

FROM

E. MACONOCHE, Esq., I.C.S.,
Under-Secretary to the Government of India,

TO

THE SECRETARY TO THE GOVERNMENT OF BOMBAY,
 GENERAL DEPARTMENT.

Dept. of Rev. & Agriculture.
Meteorology.

Calcutta, the 9th February 1899.

SIR,

A Pros., Jan.
 1898, Nos. 34
 to 43.
 F. 68 of 1897

WITH reference to the correspondence ending with Mr. Sly's letter No. 3777—68-10, dated the 30th December 1897, I am directed to forward, for the information of the Governor in Council, a copy of the papers noted in the margin regarding the proposed reorganization of Indian scientific observatories.

A Pros., Sept.
 1897, Nos. 1
 to 3.
 F. 11 of 1896.

2. The Government of India understand from Mr. Atkins' letter No. 696, dated the 9th February 1897, that the Governor in Council has no objection to the proposed scheme of reorganization and to the transfer of the control of the Colaba Observatory to the Government of India. For the present, as will appear from paragraph 5 of the Despatch to the Secretary of State, No. 14, dated 2nd February 1899, it is proposed that the existing establishment at Colaba shall be maintained, but that from 1st April next the administrative control of the observatory shall be transferred to the Meteorological Reporter to the Government of India. The necessary budget provision for the observatory will be made in the India Estimates for 1899-1900. It will be convenient to continue for the present the arrangement by which Mr. N. A. Moos is in charge of the observatory, and I am to enquire whether he can be allowed to retain a lien on his appointment in the Education Department until the future position of the Colaba Observatory in the general scheme is finally determined.

I have the honour to be,

SIR,

Your most obedient Servant,

E. MACONOCHE,

Under-Secretary to the Government of India.

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, MARCH, 1899.

Reorganisation of Indian Scientific Observatories.

[Pros. No. 10]

No. 10.] No. 227, dated Fort St. George, the 23rd February 1899.

Serial No. 22.

From—The HONOURABLE MR. G. STOKES, I.C.S., Chief Secy. to the Govt. of Madras,

To—The Secretary to the Government of India.

A Pros.,
Jan. 1899,
Nos. 5 to 8.
F. 51 of 1898.

WITH reference to your letter No. 3212—51-4, dated 18th November 1898, I am directed to enquire whether the transfer to the Government of India of the charges connected with the establishment of the Kodaikanal Observatory is likely to take place at an early date. Acting on the sanction conveyed in your letter above quoted, Mr. Michie Smith is now moving to Kodaikanal with an assistant and one peon, and he has applied to this Government for the grant to each of these subordinates of increased pay, in consideration of their transfer to a hill station. Mr. Michie Smith's application appears to this Government to be reasonable, but compliance with it will throw additional expenditure on Provincial funds, and His Excellency the Governor in Council desires, before passing orders on the proposal, to ascertain for what period this additional charge, if sanctioned, is likely to be continued.

T. W. HOLDERNESS, Esq., C.S.I.,
Secretary to the Government of India,

To

THE CHIEF SECRETARY TO THE GOVERNMENT OF MADRAS.

Dept. of Rev. & Agri.
Meteorology.

Calcutta, the 8th March 1899.

SIR,

WITH reference to the correspondence ending with your letter No. 227 (Public), dated the 23rd February 1899, I am directed to forward a copy of the papers noted in the margin regarding the re-organization of Indian observatories.

1. Despatch to Her Majesty's Secretary of State for India, No. 56, dated 1st September 1897.
2. Despatch from Her Majesty's Secretary of State for India, No. 173 (Revenue), dated 22nd September 1898, and enclosures.
3. Despatch to Her Majesty's Secretary of State for India, No. 14, dated 2nd February 1899, and enclosure.

2. The Government of India were informed in Mr. Price's letter No. 941 (Public), dated the 21st November 1893, that the Government of Madras had no objection to the transfer of the control of the Madras Observatory and the funds connected with it to the Government of India or to placing the organization and management of the Solar Physics Observatory under the Meteorological Reporter to the Government of India. I am now to acquaint you that, in anticipation of the Secretary of State's approval of the scheme of reorganization, it is proposed to give effect to these arrangements from the 1st April 1899. The Meteorological Reporter to the Government of India has been informed accordingly, and the necessary budget provision has been made in the India estimates for 1899-1900.

A Pros., Dec.,
 1893, Nos. 1
 to 7.
 F. 14.

I have the honour to be,

SIR,

Your most obedient Servant,

T. W. HOLDERNESS,

Secretary to the Government of India.

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, MARCH, 1899.

Reorganisation of Indian Scientific Observatories

[Pros. No. 12

No. 12.]

No. 875—9-24, dated Calcutta, the 9th March 1899.

Serial No. 24.

From—T. W. HOLDERNESS, Esq., C.S.I., *Secretary to the Government of India,*
To—*The Meteorological Reporter to the Government of India.*

IN continuation of Mr. Maconochie's endorsement No. 436—9-19, dated the 2nd February 1899, with which was forwarded a copy of a despatch (No. 14 of the same date) to the Secretary of State for India regarding the reorganisation of Indian observatories, I am directed to enclose, for your

1. Letter to the Government of Bombay, No. 434—9-21, dated 9th February 1899.

2. Letter to the Government of Madras, No. 873—9-23, dated 8th March 1899.

information and guidance, a copy of the letters noted in the margin on the same subject. As intimated in these letters the administrative control of the Madras and Kodaikanal observatories and the observatory at Colaba should be taken over by you as Meteorological Reporter to the Government of India from the 1st April 1899, from which date the observatories will be placed directly under the Supreme Government.

2. In paragraph 4 of the despatch referred to above, the Government of India informed the Secretary of State that they had decided to give immediate effect to the proposed scheme of establishment for the new Solar Physics Observatory at Kodaikanal and for the revision of the Madras Astronomical and Meteorological observatories set forth in paragraphs 48, 52 and 53 of your letter No. 410 S., dated the 29th May 1896,* which are identical in cost with the proposals sanctioned in Lord Kimberley's Despatch No. 117 (Rev.), dated 31st August 1893.† Provision has been made for the revised scales of establishment in the India Estimates for 1899-1900, and I am to inform you that the Government of India sanction their being brought into force from the 1st April 1899. You should now take the necessary action to carry out these orders and in communication with the Government of Madras arrange for the future location of the Madras Meteorological Office and the appointment of a successor to Miss Pogson who retires from 1st April 1899 on the pension of R250 a month sanctioned for her by the Secretary of State in consequence of the abolition of her appointment on its present footing.

No. 876—9-24.

COPY, with copy of enclosures, forwarded to the Finance Department; in continuation of endorsement No. 435—9-19, dated 2nd February 1899, for necessary action, with the intimation that the Meteorological Reporter's letter No. 410 S., dated the 29th May 1896, referred to in paragraph 2, was communicated to that Department with endorsement No. 2420—11-10, dated the 1st September 1897.

*A Pros.,
Nov. 1896,
Nos. 1 to 7.
F. 11 of 1896.

†A Pros.,
Dec. 1893,
Nos. 1 to 7.
F. 14.

A Pros.,
Sept. 1897,
Nos. 1 to 3.
F. 11 of 1896.

**PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, MARCH, 1899.**

Budget Estimate of Meteorological Department for 1899-1900. [Pros. No. 13

**BUDGET ESTIMATE OF THE METEOROLOGICAL DEPARTMENT AND SCIENTIFIC
OBSERVATORIES FOR 1899-1900.**

[Proceedings—Nos. 13 to 20.]

No. 13.]

**File No. 10 of
1898.
Serial No. 5.**

No. 13.]

No. 3082, dated, Calcutta, the 4th November 1898.

From—J. ELIOT, Esq., *Meteorological Reporter to the Government of India,*SERIAL
No. 5.

To—The Secretary to the Government of India.

I HAVE the honour to enclose herewith a copy of the Budget Estimate of this Department for the year 1899-1900 for the information of the Government.

No. 14.]

No. 1878 S. D., dated the 20th December, 1898.

SERIAL
No. 6.Endorsed by—G. H. R. HART, Esq., *Comptroller, India Treasuries.*

SUBMITTED to the Secretary to the Government of India, Revenue and Agricultural Department, for consideration and orders with one statement of changes proposed in the Budget Estimate of Expenditure of the Local authorities. This docket with other original papers to be returned.

BUDGET ESTIMATE FOR 1899-1900.

Meteorological Department.

YEAR.	Expenditure.	
	Estimates.	Accounts.
1893-94	2,78,120	3,09,648
1894-95	2,97,170	3,14,797
1895-96	3,06,030	3,27,201
1896-97	3,29,100	3,31,989
1897-98	3,30,100	3,36,680
1898-99	3,31,140	*3,26,020
1899-1900	3,26,170	

* Revised Estimate based upon seven months' actuals.

METEOROLOGICAL DEPARTMENT.

Expenditure.

PARTICULARS.	Imperial.	Local.	Total.	Explanatory Remarks of Increases and Decreases proposed in this statement.
Estimate proposed by Meteorological Reporter to the Government of India	3,29,580		3,29,580	
The following increases and decreases in the above are now proposed :—				
Increase + or Decrease —				
26. Scientific and other Minor Departments—				
Meteorological Department—				
Exchange Compensation allowance	+90		+90	According to calculation.
Inspection allowance	—100		—100	Based on actuals.
Signallers, etc., allowance	—400		—400	Ditto.
Work done by the Surveyor General's Office	—2,000		—2,000	Ditto.
Observatories.				
Bengal	—30		—30	According to Audit Register.
Punjab	×90		+90	Ditto.
Madras	—60		—60	Ditto.
Special Storm Observation, etc.	—1,000		—1,000	Based on actuals.
Net Total of Increases and Decreases	—3,410		—3,410	
Estimate proposed by Comptroller, India Treasuries, being net result of above	3,26,170		3,26,170	

OFFICE OF COMPTROLLER, INDIA TREASURIES ;
The 20th Decemr 1898.

G. H. R. HART,
Comptroller, India Treasuries.

No. 15.]

No. 51-10-7, dated Calcutta, the 5th January 1899.

SERIAL
No. 7.*From—E. MACONOCHE, Esq., Under-Secretary to the Government of India,**To—The Meteorological Reporter to the Government of India.*

WITH reference to the Budget Estimate of the Meteorological Department for 1899-1900 forwarded with your letter No. 3082, dated the 4th November 1898, I am directed to enquire what additions will be required to the proposed estimates for 1899-1900 if the proposals made in your letter No. 553 S., dated the 28th September 1898, are accepted.

The favour of an early reply is requested.

No. 16.]

No. 31 S., dated Simla, the 10th January 1899.

SERIAL
No. 8.*From—J. ELIOT, Esq., Meteorological Reporter to the Government of India,**To—The Secretary to the Government of India.*

I HAVE the honour to acknowledge the receipt of your letter No. 51—10-7 of the 5th January 1899, enquiring what additions will be required to the proposed estimates for 1899-1900 if the proposals made in my letter No. 553 S., dated the 28th September 1898, are accepted.

2. In reply, I have the honour to state that the more important additions will be as follows:—

A. Under heading "Reporters":—

First Assistant to India Meteorological Reporter at R400 per mensem	4,800
Second Assistant to India Meteorological Reporter at R250 per mensem	3,000

B. Under heading "Establishment":—

Inspector of observatories at R50 per mensem	600
--	-----

C. Under heading "Establishment, Simla Office":—

1 Draughtsman at R35 per mensem	420
1 Clerk at R65 per mensem	780
3 Clerks at R45 per mensem each	1,620
1 Draughtsman at R30 per mensem	360
1 Clerk at R30 per mensem	360
Total	3,540

D. Under heading "Observatories":—

1 Additional observer in the Central Provinces at R10 per mensem	120
5 Additional observers in Assam at R10 per mensem each	600
1 Observer and peon at the proposed Chor observatory at R40 per mensem	480
Also six allowances to second class observatories provided during year with Richard barographs and thermographs at R5 per mensem each (Details of this cannot be given as six observers have not yet been selected)	360

3. The following are the chief decrements or savings:—

A. Under the heading "Establishment, Calcutta Office":—

7 Clerks pensioned off, viz., 1 Draftsman at R40 to 50 per mensem, 4 First class Tabulators at R40 to 55 per mensem, 2 Second class Tabulators at R30 to 40 per mensem	4,140
--	-------

B. Under heading "Observatories":—

22 Observers reduced from Second class at R18 per mensem to Third class at R10 per mensem (Details of these savings if required can be obtained by reference to my Calcutta Office.)	2,112
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4. I trust this gives the information required in suitable form.

No. 17.]

No. 29 S., Dated Simla, the 9th January 1899.

SERIAL
No. 9.*From—J. ELIOT, Esq., Meteorological Reporter to the Government of India,**To—The Secretary to the Government of India.*

I HAVE the honor, in reply to your No. 3347—51-5 of the 2nd December 1898, to send you the detailed estimates for 1899-1900 of the Colaba, Kodaikanal, and Madras Observatories as set forth in my letter No. 410 S.,* dated the 29th May 1896, and as modified in the Nos. 1 to 7, Despatch to the Secretary of State, No. 56,† dated 1st September 1897, and the Despatch to the Secretary of the State containing the recommendations of the Committee which considered the reports of the Astronomer Royal and Sir J. N. Lockyer and the suggestions of the Observatories Committee of the Royal Society.

*A Pros.,
Nov. 1896,
Nos. 1 to 7.
†A Pros.,
Sept. 1897,
Nos. 1 to 3.

2. I have consulted the Director of the Colaba observatory and the Government Astronomer, Madras, and enclose their letters in original for the information of the Government. If not required, they should be returned to my office, or if required copies should be sent to me.

3. Mr. Michie Smith, Government Astronomer, in his letter dated 30th December, suggested several slight additions to the budget estimate I sent for his consideration. I have embodied the whole of them as they appear to be necessary additions under the circumstances.

4. Mr. Michie Smith also suggests that the estimate for "purchase and repairs of instruments will have to be increased" in order to include the cost of the two new instruments recommended by the Observatories Committee as urgently necessary for the full equipment of the Solar Physics observatory.

As he is unable to state the cost of these instruments, I have not included them in the budget estimate. They can be probably best sanctioned as an urgent indent on the Secretary of State.

5. Mr. Moos similarly suggests that in his budget estimate the item "Value of and Freight of English Stores" should be increased by Rs.1,000 in order to include cost of a standard magnetometer which is urgently required for the Colaba observatory. This instrument should undoubtedly be obtained at an early date and added to the equipment of that observatory.

6. It is perhaps a question that ought to be considered and decided whether the indents for instruments of these observatories should be included in my annual indent, and if so it would not be necessary to include an estimate for them in the annual budget of these observatories.

No. 18, dated 6th January 1899.

From—N. A. F. Moos, Esq., Director, Government Observatory, Bombay,

To—The Imperial Meteorologist, Government of India.

IN continuation of my letter No. 567, dated the 29th December 1898, forwarding the Budget Estimate for 1899 and 1900, I have the honour to request that you will kindly allow me to modify the figure Rs.1,222 to Rs.2,222 under the heading "Value of and Freight on English Stores" in the Budget Estimate forwarded to you for providing a good Standard Magnetometer, the want of which has been very severely felt in the Observatory. I beg to send you a copy of the Resolution of the Local Government, from which you will see that the purchase, though of great importance, was deferred on account of reasons stated in the Resolution, and I hope you will allow me now to include the item in the Budget Estimate.

As I am not quite sure whether you wish me also to send you my recommendations for any change or alteration or addition in the Staff of the Observatory as part of the Budget, I have refrained from suggesting any change and have merely forwarded to you the copy of the Budget Estimate submitted to the Local Government in September last.

Extract from the Proceedings of the Government of Bombay, General Department,—No. 6024, dated 2nd November 1897.

READ—

Letter from the Director, Government Observatory, Colaba, No. 351, dated the 14th September 1897—

"I have the honour to request the favour of the sanction of Government to the purchase of an Unifilar Magnetometer to be included in the next year's indent of apparatus required for this Observatory. The Kew Unifilar which has been in use now for over 30 years gives excellent results, and yet as it is the only instrument in the Observatory for absolute determinations, it is necessary that such results should be properly checked by another standard instrument. The necessity of such comparison is recently found to be of the very greatest importance, as will be seen from the following extracts from the speech of Dr. Rücker, President of the British Association Meeting held at Oxford in 1894, on 'Terrestrial Magnetism'—

'In the first place, then, there is little doubt that the instruments at present used for measuring declination and horizontal force are affected with errors far greater than the error of observation.

'We employed four magnetometers by Elliot Brothers, which were frequently compared with the standard instrument at Kew. These measurements proved that the instrumental differences which affect the accuracy of the declination and horizontal force measurements are from five to ten times as great as the error of a single field determination.

'This point has been investigated by Dr. Van Rijkevarsel, who five years ago visited Kew, Pare St. Maur, Wilhelmshaven and Utrecht, and, using his own instruments at each place, compared the values of the magnetic elements determined by himself with those deduced from the self-registering apparatus of the Observatory.

'The discrepancies between the so-called standards which were thus brought to light were quite startling and prove the necessity for an investigation as to their causes.'

"I beg therefore that Government will be pleased to sanction the purchase of the instrument, the cost of which will be about £60, the item having been included in the estimate of stores required from England for the year 1898-99 and submitted last July to the Financial Department of Government."

Letter from the Director, Government Observatory, Colaba, No. 407, dated the 23rd October 1897—

"In reply to your memorandum No. 5773, dated the 21st October 1897, I have the honour to state that the instrument will be required under any circumstances whether the Observatory is to continue to remain in the present condition or modified under the new reorganization scheme.

"With regard to the enquiry whether the purchase of the instrument cannot be deferred, I respectfully beg to submit that the scheme will take some considerable time before it is brought into operation, and from the standpoint of scientific investigation the need of the instrument appears to me to be urgent."

RESOLUTION.—In present circumstances Government regret that they cannot give immediate sanction for the purchase of an Unifilar Magnetometer.

No. 567, dated 29th December 1898.

From—N. A. F. Moos, Esq., Director, Government Observatory, Bombay,

To—The Meteorological Reporter to the Government of India.

With reference to your letter No. 3534, dated the 22nd December 1898, I have the honour to forward herewith the estimate, blank columns of which have been duly filled in, as well as a copy of the Budget Estimate for the year 1899-1900 submitted to the Local Government in September last, from this office.

COLABA (BOMBAY)—EXPENDITURE.

Detailed Account No. 26C.—Scientific, etc., Departments—Public Observatories.

	Numbers.			Budget Estimate, 1899-1900.		Revised Estimate, 1898-99.		Budget Estimate, 1898-99.		Accounts, 1897-98.	
	1898-99.	1899-1900.		₹	₹	₹	₹	₹	₹	₹	₹
Government Observatory, Bombay.											
Salaries . . .	1	1	Director (R500) .	6,000				6,000		6,400	
			Exchange compensa- tion allowance.		6,000				6,000		6,400
Establishment .	1	1	Assistant (R105) .	1,260				1,260			
	1	1	Assistant (R80) .	960				960			
	1	1	Assistant (R60) .	720				720			
	1	1	Assistant (R50) .	600				600			
	3	3	Assistants (R40 each) .	1,440				1,440			
	1	1	Assistant (R30) .	360				360			
			Allowance of R10 and R5 to two Photograp- hic Assistants.	180				180			
Allowances . .	1	1	Servant (R10) . .	120				120			
	4	4	Servants (R8 each) .	384				384			
					6,024				6,024		5,865
Supplies and ser- vices.			Petty Construction	450				450			
			Value of and freight on stores from England.	2,184				2,194		1,830	
			Supply of medicines	8				8		3	
			Charges for mounting an instru- ment.	200				200			
					2,842				2,842		1,833
Contingencies .			Water supply	100				100		79	
			Rates and Taxes	80				80		59	
			Postage charges	75				75		82	
			Telegram charges	10				10		23	
			Purchase of furniture	50				50		104	
			Purchase of books	250				250		164	
			Repair of furniture	50				50		44	
			Miscellaneous office expenses .	966				966		948	
					1,581				1,581		1,503
			Travelling Allowance							125	214
			Grain Compensation							89	
					16,447				16,467		15,815
			Deduct for rounding		447				447		
			TOTAL		16,000				16,000		

BUDGET ESTIMATE, 1899-1900.

26.—SCIENTIFIC AND OTHER MINOR DEPARTMENTS.

Office of Government Observatory, Bombay.

NUMBERS.		26.—Scientific and other Minor Departments.	BUDGET ESTIMATE, 1899-1900.				Explanation of increase or decrease.
1898-99.	1899-1900.		Actuals, 1897-98.	Sanctioned Estimate, 1898-99.	Director's.	Accountant General's.	
1		Salaries—					
		Director	6,400	6,000	8,400*	...	* See Despatch from the Secretary of State, No. 69 (Revenue), dated the 6th May 1897, to the Government of India quoted in Government Resolution, General Department, No. 3946, dated 20th July 1897.
		Total Salaries	6,400	6,000	8,400		
		Establishment—					
8		Clerks	5,369	5,520	5,520		† See letter of the Director, Government Observatory, Colaba, No. 57, dated the 1st February 1898, to the Secretary to Government, General Department, and Government Resolution, General Department, No. 2375, dated the 27th April 1898, thereon. See Government Resolution, Public Works Department, No. 32 C. W.—217, dated 4th February 1895.
5		Servants	496	504	504		
		Total Establishment	5,865	6,024	6,024		
		Allowances—					
		Travelling, horse and conveyance allowance to officers. }	125	...	1,000†	...	
		Travelling, horse and conveyance allowance to establishment. }	89	...	...
		Grain compensation					
		Total allowances	214	...	...
		Supplies and Services—					
		Petty construction . . . . .	...	450	450	
		Value of and Freight on English Stores.	1,830	2,184	1,222		
		Supply of medicines	3	8	8		
		Charges for mounting instruments. . . . .	...	200	...	
		Total Supplies and services	1,833	2,842	1,680		
		Contingent Charges—					
		Rates and taxes	59	80	60		† Increase in amount is consequent upon the introduction of the Shone system of drainage in the compound.
		Postage charges	82	75	80		
		Telegram charges	23	10	20		
		Purchase of furniture	104	50	100		
		Repairs to furniture	44	50	50		
		Purchase of books	164	250	250		
		Water-supply	79	100	250†		
		Miscellaneous office expenses	948	966	981		
		Total contingent charges	1,503	1,581	1,791		
		Deduct for rounding . . . . .	...	16,447	...	
		GRAND TOTAL	15,815	16,000	18,895		

All the officers of the Observatory Establishment are provided with free quarters on the premises of the Observatory.

No. 436, dated Bombay, the 23th September 1898.

Endorsed by the Director, Government Observatory.

FORWARDED to the Accountant General, Bombay.

Details of Establishment.

No.	Designation.	Monthly Pay.	Annual Cost.	REMARKS.
1	Director	700	8,400	
MAGNETICAL DEPARTMENT.				
1	1st Assistant	105	1,260	
1	2nd Assistant	60	720	
1	1st Observer	40	480	
1	2nd „	40	480	
1	3rd „	40	480	
1	Computer	30	360	
	Allowance to the 1st and 2nd photographic assistants	15	180	
ASTRONOMICAL DEPARTMENT.				
1	1st Assistant	80	960	
1	2nd „	60	600	
		460	5,520	
MENIAL ESTABLISHMENT.				
5	One Hamal on R10 and four Hamals at R8 each	42	504	

N. A. F. MOOS,
Director, Government Observatory.

No. 226, dated 30th December 1898.

From—C. MICHIE SMITH, Esq., Government Astronomer, Madras,

To—The Meteorological Reporter to the Government of India.

I HAVE the honour to return herewith the draft budget forwarded with your letter of the 22nd instant, No. 3535, in which I have, as requested, filled in the blank columns.

2. I assume that you do not wish me to separate the expenditure on allowances, supplies and services, and contingencies as required for Madras and for Kodaikanal, and on that assumption I should make the following suggestions.

- (a) Travelling allowance is insufficient as the charges for the assistants, peons, etc., to Kodaikanal will have to be met and probably my own expenses for two journeys. This will cost about R600.
- (b) Purchase and repair of instruments.—This I presume will have to be increased in view of the purchase of the two new instruments.
- (c) Packing and carriage of instruments.—This will have to be increased as it is unlikely that I can do all that is required for the R1,500 allowed before the close of the year. I would suggest R500.
- (d) Cost of Europe stores.—This will now include photographic chemicals, etc., also the supply of a set of chemicals and chemical apparatus such as glassware for the laboratory. We estimated the annual charge for this at about £50, and till some experience of the actual cost has been got I do not see that I need change this. There will be less work done the first year, but, on the other hand, developing dishes, etc., will have to be purchased.
- (e) Landing and shipping charges, say R50.
- (f) Peons' belts and badges.—These will have to be supplied new and will cost for 4 peons about R25.
- (g) Carriage of stationery, say R20.
- (h) Hot and cold weather charges.—The hot weather charges can be reduced here to one-half, but the peons and lascars will require to get thick coats for the hills. I do not know what rate is allowed per head, but probably it will be practically the same here as at Simla.
- (i) Sweepers' allowance. } These will have to be increased to at least R60.
Scavenging charges. }
- Telegraph, see the G. O. sent herewith.
- (j) Lighting charges increase to R150. The lighting of the seismometer now costs about R2 per mensem.
- (k) Office expenses, say R50.
- (l) Miscellaneous, say R50.

KODAIKANAL—EXPENDITURE.

Detailed Account No. 26.—Scientific, etc., Departments.

	Numbers.			Budget Estimate, 1899-1900.		Revised Estimate, 1898-99.		Budget Estimate, 1898-99.		Accounts, 1897-98.	
	1898-99.	1899-1900.		R	R	R	R	R	R	R	R
Salaries	1	Director (R800) . .	9,600	9,600						
Establishment	1	1st Assistant (R150—250).	1,800							
		1	2nd Assistant (R100—150).	1,200							
		1	3rd Assistant (R70—90).	840							
		1	4th Assistant (R50—70).	600							
		1	Mechanic (R40) . .	480							
		1	Writer (R30—50) . .	360							
		2	Menial Assistants (R15—25 each).	360							
		1	Peon (R12) . . .	144							
		2	Peons (R10 each) . .	240							
		1	Peon (R9) . . .	108							
		2	Lascars (R8-8 each) .	204							
				6,276							
				15,876							
				124							
			Add for rounding . .	...						
			Total . .	...	16,000						

MADRAS—EXPENDITURE.

Detailed Account No. 26 E.—Scientific, etc., Departments.—Public Observatories.

			Numbers.			Budget Estimate, 1899-1900.		Revised Estimate, 1898-99.		Budget Estimate, 1898-99.		Accounts, 1897-98.	
			1898-99.	1899-1900.		R	R	R	R	R	R	R	R
<i>PROVINCIAL.</i>													
Salaries	.	.	1	...	Astronomer (R800)*	...		9,600		9,600		9,600	
			1	...	Exchange compensa- tion allowance.	...		653		774		885	
Establishment	.	.	...	1	Superintendent (R100).*	1,200		...		...		...
			1	...	Assistant to Astro- nomer (R:50).	...	1,200	1,800	10,253	1,800	10,374	1,650	10,485
			1	1	Computer (R100)	1,200		1,200		1,200		1,200	
			1	...	Assistant (R80)	...		960		960		960	
			1	1	" (R60)	720		720		720		720	
			1	...	" (R44)	...		528		528		528	
			1	1	" (R40)	480		480		480		480	
			1	...	" (R21)	...		252		252		252	
			1	1	Servant (R10)	120		120		120		120	
			2	1	" (R8 each)	96		192		192		192	
			2	2	Lascars, (R7 each)	168		168		168		168	
					Temporary Establish- ment.	...		...		...		60	
							2,784		6,420		6,420		6,330
Allowance	.	.			Travelling allowance	400	...	400	...	400	...	352	
					Allowance for fixing the Time- Gun at Fort St. George (Maximum R15).	320		320		320		313	
					Allowance for the Marine Sig- naller at the Port Office (Maxi- mum R15).								
Supplies and Services.	and				Public clock charges	30	720	30	720	30	720	15	665
					Purchase and repair of instru- ments.	600		600		600		245	
					Petty works of construction	...		...		...		...
					Charges connected with the eclipse of the sun.	...		...		...		3,316	
							630		630		630		3,576

* With free quarters.

MADRAS—EXPENDITURE—continued.

Detailed Account No. 26 E.—Scientific, etc., Departments—Public Observatories—continued.

		Budget Estimate, 1899-1900.		Revised Estimate, 1898-99.		Budget Estimate, 1898-99.		Accounts, 1897-98.	
		₹	₹	₹	₹	₹	₹	₹	₹
<i>PROVINCIAL</i> —continued.									
<i>Contingencies</i>	Purchase of country Articles, each costing less than ₹50.	100		100		100		...	
	Packing and carriage charges of Instruments.	100		100		100		...	
	Purchase of Books	100		100		100		49	
	Purchase of Periodicals . . .	100		100		100		148	
	Cost of Europe stores (including Freight).	...		20		...		...
	Landing and shipping charges .	10		15		10		39	
	Petty repairs to buildings . .	10		10		10		1	
	Purchase of and repairs to furniture.	50		50		50		29	
	Peons' Belts and Badges . . .	...		...		...		...
	Carriage of Stationery and Records.	1		1		1		1	
	Hot and cold weather charges .	64		64		64		58	
	Sweepers' allowances . . . .	...		...		...		...
	Scavenging expenses	6		6		6		6	
	Postage charges	250		250		250		102	
	Telegraph charges	150		150		150		1	
	Telephone charges	264		264		264		255	
	Rents, Rates, and Taxes . . .	336		336		336		336	
	Lighting charges	75		70		75		63	
	Petty carriage and cooly charges.	20		30		20		30	
	Office expenses	20		20		20		18	
	Miscellaneous	14		10		14		10	
			1,670		1,696		1,670		1,146
			7,004		19,719		19,814		
			4		19		14		
Deduct—For rounding .									
Total .			7,000		19,700		19,800		22,202

Extract from the Proceedings of the Government of Madras, Financial Department,—No. 844, Financial, dated 3rd October 1898.

READ the following papers:—

From the Government Astronomer, dated 12th September 1898, No. 170, submitting his budget estimates for 1899-1900.

Order thereon by the Government of Madras.

Some items under *Supplies and Services* and *Contingencies* which have been over-estimated have been reduced with reference to the actuals for the past three years.

2. The charges in connection with the Observatory at Kodaikanal have been separately exhibited as directed in G. O. No. 740, Financial, dated 26th August 1898, pending the final orders of the Government of India as to the correct incidence of the charges.

3. The estimates are accepted as appended to these Proceedings.

EXPENDITURE.

Detailed Account No. 26 E.—Scientific, etc., Departments—Public Observatories.

	Numbers.			Hudget Estimate, 1899-1900.		Revised Estimate, 1898-99.		Budget Estimate, 1898-99.		Accounts, 1897-98.	
	1898-99.	1899-1900.		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
PROVINCIAL.											
Salaries . .	1	1	Astronomer (800)* .	9,600	10,286	9,600	10,253	9,600	10,374	9,600	10,485
	1	1	Exchange Compensation Allowance.	686		653		774		885	
Establishment .	1	1	Assistant to the Astro- nomer (150).	1,800		1,800		1,800		1,650	
	3	3	Assistants (100), (80), (60).	2,880		2,880		2,880		2,880	
	3	3	Assistants (44), (40) (21).	1,260		1,260		1,260		1,260	
	5	5	Servants 1 (10), 2 (8), 2 (7).	480		480		480		480	
			Temporary Establish- ment (60).	...	6,420	...	6,420	...	6,420	60	6,330

* Has free quarters.

EXPENDITURE—continued.

Detailed Account No. 26 E.—Scientific, etc., Departments—Public Observatories—continued.

	PROVINCIAL—contd.	Budget Estimate, 1899-1900.		Revised Estimate, 1898-99.		Budget Estimate, 1898-99.		Accounts, 1897-98.	
		R	R	R	R	R	R	R	R
<i>Allowances</i>	Travelling Allowance . . .	400		400		400		352	
	Allowance for firing the Time-Gun at Fort St. George (maximum 15)	320		320		320		313	
	Allowance for the Marine Signal- ler at the Port Office (maximum 15)		720		720		720		665
<i>Supplies and Services.</i>	Public Clock Charges . . .	30		30		30		15	
	Purchase and Repair of Instru- ments	400		600		600		245	
	Petty Works of Construction . .	50		...		...		...
	Charges connected with the eclipse of the Sun . . . . .	...		...		...		3,316	
			480		630		630		3,576
<i>Contingencies</i>	Purchase of Country Articles each costing less than Rs50 . . .	50		100		100		...	
	Packing and Carriage Charges of Instruments	50		100		100		...	49
	Purchase of Books	100		100		100		143	
	Purchase of Periodicals	100		100		100		...	
	Cost of Europe Stores (including Freight)	30		20		...		...	39
	Landing and Shipping Charges .	20		15		10		1	
	Petty Repairs to Buildings . .	10		10		10		...	
	Purchase of and Repairs to Furni- ture	30		50		50		29	
	Peons' Belts and Badges . . .	...		...		...		...	1
	Carriage of Stationery and Records	1		1		1		58	
	Hot and Cold Weather Charges .	64		64		64		...	6
	Sweepers' Allowances . . . .	...		...		...		...	102
	Scavenging Expenses	6		6		6		1	
	Postage Charges	110		250		250		255	
	Telegraph Charges	10		150		150		336	
	Telephone Charges	264		264		264		63	
	Rents, Rates, and Taxes . . .	336		336		336		30	
	Lighting Charges	70		70		75		18	
	Petty Carriage and Cooly Charges	30		30		20		10	
	Office Expenses	20		20		20		...	
	Miscellaneous	10		10		14		...	
			1,311		1,696		1,670		1,146
			19,217		19,719		19,814		...
	Deduct—For rounding . . .		17		19		14		...
	TOTAL		19,200		19,700		19,800		22,202
	KODAIKANAL OBSERVATORY.								
<i>Establishment</i>	Additional Mechanic 40 (a) . .	...		120		...		...
<i>Allowances</i>	Travelling Allowance (a) . . .	...		380		...		...
<i>Supplies and Services.</i>	Cost of Instruments (including Freight) (b)	1,500	1,500	2,763	2,763	...	...	12,658	12,658
<i>Contingencies</i>	Packing and Carriage Charges of Instruments and Books (b) . .	500	500	1,500	1,500	...	...	...	...
			2,000		4,763		...		12,658

(a) See letter to the Chief Secretary to Government, No. 161, dated 30th August 1898.

(b) G. O. No. 740, Financial, dated 25th August 1898.

Detailed Account No. 30 D.—Stationery and Printing.—Printing at Private Presses.

PROVINCIAL.							
Printing at Private Presses .	500	200	1,000	2			
	500	200	1,000				2

No. 194, dated the 21st October 1898.

From—C. MICHIE SMITH, Esq., Government Astronomer,

To—The Chief Secretary to the Government of Madras.

WITH reference to G. O. No. 844, Financial, dated 3rd October 1898, I have the honour to call attention to the following points in the sanctioned budget estimate.

2. The sum of Rs12,658 entered in the accounts column, 1897-98, under the heading Kodaikanal Observatory ought to be Rs11,397, as it was in my original. The balance of Rs1,261 should be entered under the Madras Observatory. This sum was spent, under sanction from the Madras Government, on instruments for the Madras Observatory.

3. The reduction of the postage charges from Rs250 to Rs110 is founded on a misapprehension of the value of a three years' average. The amount of the postage charges for this office depends mainly on whether or not any publication is issued from the Observatory. In all probability publications will be issued both this year and next, while there has been no large volume issued since 1894.

4. As regards telegraph charges, it will certainly be impossible to keep down the amount to Rs10 when both the Madras and Kodaikanal Observatories are working. In any case there

* G. O. No. 460, Financial, dated 8th June 1897. is a sanctioned expenditure of Rs112* for rent of telegraph lines for which no provision is made in the budget as issued. If this rent is to be paid from some other source, the amount* required for telegrams will be small, but I don't think it can be safely estimated as less than Rs50.

5. As regards the other reductions which have been made, I can only say that the estimates have been drawn up with every care, and that the sums asked for are the least with which it seems to me that the Observatory can be efficiently worked.

6. It must be remembered that whether the Government of India takes over the Observatory on April 1st or later, both the Madras and the Kodaikanal Observatories will have to be maintained, and this cannot be done without some expenditure on contingencies.

ORDER—No. 1082, Financial, dated 19th November 1898.

As the sum of Rs1,261 spent on instruments for the Madras Observatory in 1897-98 was unusually large, an explanatory remark should have been added by the Government Astronomer in his estimates, as required by rule 29 of the instructions relating to the preparation of budget estimates. The necessary alteration will now be made.

2. The reduction under *Postage Charges* was based on the facts that the actuals of 1897-98 amounted to Rs102, and that a sum of Rs3 only was entered as the amount spent during the first six months of the current year. If the Government Astronomer anticipated exceptional expenditure in the ensuing year, this should have been stated. The grant for the current year will, under the explanation now offered, be repeated in the budget estimate for 1899-1900.

3. As the *Telegraph Charges* for the past two years were almost nominal, it is not understood how the contribution for the rent of telegraph lines charged to the Madras Observatory has been debited hitherto. The Accountant General will be requested to report on the matter.

4. The reductions in other items were based on the facts and figures placed before Government by the Government Astronomer. Provision for the expenditure on the Kodaikanal Observatory cannot be entered in the estimates in the absence of instructions from the Government of India.

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, MARCH, 1899.

Budget Estimate of Meteorological Department for 1899-1900. [Pros. No. 18

No. 18.] No. 656 A., dated Calcutta, the 9th February 1899.

Serial No. 10.

*From—The Under-Secretary to the Government of India, FINANCE and COMMERCE
DEPT.,*

To—The Comptroller, India Treasuries.

<i>Salaries—</i>	R
Meteorological Reporter, Madras .	—2,400
<i>Establishment—</i>	
Meteorological Office, Madras, clerks .	—276
Servants	—324
Special storm observations and investigations	+1,000
Lump addition on account of the contemplated reorganisation of the Meteorological Department	+4,000
Net increase	2,000

IN returning the Budget Estimates of the Meteorological Department for the year 1899-1900, I am directed to say that the Estimate of Revenue has been passed for Rs. 7,970 as proposed, and that the estimate of expenditure has been raised by Rs. 2,000 as shown in the margin and passed for R 3,28,170.

2. A provision of Rs. 4,575, as shown in the accompanying detailed statement, should also be made on account of Scientific Observatories in India to be transferred under the control of the Meteorological Reporter.

Original papers returned.

ORDERED, that copy be forwarded to the Revenue and Agricultural Department for information.

Budget Estimates of Scientific Observations in India for the year 1899-1900.

EXPENDITURE.

Nos.	Minor and Detailed Heads.	Budget, 1899-1900.	
		R	A
	COLABA (BOMBAY)—		
	MAGNETICAL AND METEOROLOGICAL—		
	<i>Salaries—</i>		
1	Director	6,000	
	Exchange compensation allowance . . . . .	...	6,000
1			
	<i>Establishment—</i>		
1	1st Assistant at R105	1,260	
1	2nd do. at R60	720	
3	Observers (R40 each)	1,440	
1	Computer at R30	360	
	Allowance of R10 and R5 to 1st and 2nd Photo. Assistants	180	
1	Servant at R10	120	
4	Servants at R8 each	334	4,464
11			
	<i>Allowances—</i>		
	Travelling, horse and conveyance to officers	} 1,000	
	Do. do. to establishment		
	Grain compensation . . . . .	...	1,000
	<i>Supplies and Services—</i>		
	Petty construction	450	
	Freight on stores from England	500	
	Supply of medicines	8	
	Charges for mounting instrument . . . . .	...	958
	<i>Contingencies —</i>		
	Water-supply	250	
	Rates and taxes	60	
	Postage charges	80	
	Telegram charges	20	
	Purchase of furniture	100	
	Purchase of books	250	
	Repair of furniture	50	
	Miscellaneous office expenses	981	1,791
	ASTRONOMICAL—		
1	<i>Establishment—</i>		
1	1st Assistant at R80	960	
2	2nd do. at R50	600	1,560
	Total Colaba		15,773
	KODAI KANAL—		
	SOLAR PHYSICS—		
1	<i>Salaries—</i>		
	Director at R800	9,600	
1	Exchange compensation allowance	686	10,286
1			
	<i>Establishment—</i>		
1	1st Assistant (R150—250)	1,800	
1	2nd do. (R100—150)	1,200	
1	3rd do. (R70—90)	840	
1	4th do. (R50—70)	600	
1	Mechanic at R40	480	
2	Writer at (R30—50)	360	
1	Menial Assistants (R15—25 each)	360	
2	Peon at R12	144	
1	Peons, at R10 each	240	
2	Peon at R9	108	
14	Lascars (R8-8 each)	204	6,336
	<i>Supplies and Services—</i>		
	Carriage of instruments and books	500	500
	Total Kodai Kanal		17,123

Budget Estimates of Scientific Observations in India for the year 1899-1900—contd.

EXPENDITURE—contd.

Nos.	Minor and Detailed Heads.	Budget, 1899-1900.	
		R	R
	MADRAS—		
	Astronomical—		
	Salaries—		
1	Deputy Director at R100	1,200	
1			1,200
	Establishment—		
1	Computer at R100	1,200	
1	Assistant at R60	720	
1	Ditto at R40	480	
1	Servant at R10	120	
1	Ditto at R8	96	
2	Lascars, at R7 each	168	
7			2,784
	Allowances—		
	Travelling allowance	600	
	Allowance for firing the time gun at Fort St. George (maximum R15)	320	920
	Allowance for the marine signaller at the Port Office (maximum R15)		
	Supplies and Services—		
	Public clock charges	30	
	Purchase and repair of instruments	600	
	Petty works of construction	50	
	Charges connected with the eclipse of the sun . . . . .	...	680
	Contingencies—		
	Purchase, of country articles each costing less than R50	100	
	Packing and carriage charges of instruments	500	
	Purchase of books	100	
	Ditto of periodicals	100	
	Landing and shipping charges	50	
	Petty repairs to buildings	10	
	Purchase of and repair to furniture	30	
	Peons' belts and badges	25	
	Carriage of stationery and records	20	
	Hot and cold-weather charges	32	
	Warm clothing for six peons at Kodai Kanal (R10 each) per annum	60	
	Sweepers' allowances	60	
	Scavenging expenses		
	Postage charges	250	
	Telegraph charges	150	
	Telephone charges	264	
	Rents, rates and taxes	336	
	Lighting charges	150	
	Petty carriage and cooly charges	20	
	Office expenses	50	
	Miscellaneous	50	
			2,357
	Total Madras (Astronomical)		7,941
	GRAND TOTAL, COLABA, KODAI KANAL AND MADRAS		40,836
	Deduct—		
	Contribution from Provincial Revenues, Bombay	16,447	
	Ditto do. do. do. Madras	19,814	
			36,261
	Net Expenditure		4,575

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, MARCH, 1899.

Budget Estimate of Meteorological Department for 1899-1900. [Pros. No. 19

No. 19.] No. 540—10-11, dated Calcutta, the 22nd February 1899.

Serial No. 11.

From—E. MACONOCHE, Esq., Under-Secretary to the Government of India,

To—The Meteorological Reporter to the Government of India.

WITH reference to your letters noted on the margin I am directed to forward a copy of a letter from the Finance Department, No. 656 A., dated the 9th February 1899, and enclosure, containing orders on the Budget Estimates of the Meteorological Department and Scientific Observatories for the year 1899-1900.

No. 3082, dated 4th December 1898.

No. 31 S., dated 10th January 1899.

No. 29 S., dated 9th January 1899.

2. I am to add that a separate communication will be made to you on the subject of paragraph 6 of your letter No. 29 S., dated the 9th January 1899.

(1) Letter from the Director, Government Observatory, Bombay, No. 18, dated 6th January 1899, and enclosures.

(2) Letter from the Director, Government Observatory, Bombay, No. 567, dated 29th December 1898, and enclosures.

(3) Letter from the Government Astronomer Madras, No. 226, dated 30th December 1898, and enclosures.

3. The original papers received with your letter of the 9th January 1899 are returned.

No. 20.] No. 1014—10-12, dated Calcutta, the 25th March 1899.

Serial No. 12.

From—E. MACONOCHE, Esq., Under-Secretary to the Government of India,

To—The Meteorological Reporter to the Government of India.

IN continuation of my letter No. 540—10-11, dated the 22nd February 1899, and with reference to paragraph 6 of your letter No. 29 S., dated 9th January 1899, I am directed to inform you that the instruments required for the Colaba, Madras and Kodaikanal Observatories should be included in your annual indents of stores required from Europe. Forecasts of such demands should also be included in your annual estimates of stores of European manufacture.

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, MARCH, 1899.

Formation of a magnetic survey party.

[Pros. No. 21

FORMATION OF A MAGNETIC SURVEY PARTY.

[Proceedings—Nos. 21 and 22.]

No. 21.]

File No. 16 of
1899.
Serial No. 1.

No. 677-S., dated Calcutta, the 25th February 1899.

From—MAJOR GENERAL C. STRAHAN, R.E., *Surveyor General of India,*
To—*The Secretary to the Government of India.*

I HAVE the honour to acknowledge your No. 468—9-20, dated 13th February 1899, regarding the formation of a Magnetic Survey Party.

2. I have selected Captain Fraser, R.E., as a suitable officer to conduct the operations, and Lieutenant-Colonel Gore, the Superintendent, Trigonometrical Surveys, agrees with me in recommending him; he is at present in charge of the triangulation party connecting the Indian and Burman triangulation, but will complete his work some time next month when he will be available for this new work. I propose that, as soon as possible after his return from Burma, he should be sent to England with orders to call on Professor Rücker and ask for his advice as to the nature of the instruments he should use, the number and distance apart of the stations of observation and all other details regarding the conduct of the preliminary survey. Professor Rücker, in his minute accompanying his letter to the Under Secretary of State dated 27th July 1898, has suggested that the stations of observation should be not less than 40 to 50 kilometres (say 25 to 30 miles) apart, but the number in this case would be so very great that it would be impossible, without a far larger establishment than this department can furnish, to complete the first survey in less than 8 or 10 years. I therefore propose that a station be made in the centre of each square degree, which would reduce the total number of stations of observation to less than a quarter of what has been proposed by Professor Rücker. After the first survey has been completed the number of stations of observation can be increased as much as may be considered necessary in any places where abnormal deviations have been discovered.

3. I have reckoned that there are 300 square degrees in India, including Kashmir and Burma, and as I believe a trained officer should be able to take one observation a week, including his moving from one place to another, it follows that one observer working from 1st October to 30th April would complete 30 observations in one year, or five would finish the whole in two years. These five observers I propose to draw from the Provincial Service and to train them at Dehra in the use of the instruments which we now possess; it is possible that the instruments which they will actually use will not be quite the same, but they will readily pick up the use of the new ones if they are familiar with those we now have. When once these observers have fairly started no doubt Captain Fraser will himself have leisure to take observations, for there will not be very much for him to do in the way of inspection; this will materially assist the progress of the work.

4. I should start the work simultaneously in different parts of India, sending one observer to Burma and dividing India up into convenient portions amongst Captain Fraser and the other four observers. In this way even at the end of the first season we shall have some idea of the distribution and direction of the magnetic force.

5. The extra cost involved will be very little, if any. Captain Fraser and the five Provincial officers will have to be paid for in any case as they form part of the permanent establishment of the Department; their travelling expenses will no doubt be high, but then each will have but a small staff of klassies and no sub-surveyors. So as to interfere with the existing work as little as possible I would select the officers to be trained from the junior men, probably from those now under training at Dehra or who have lately passed out. No long experience is required, only great care and delicacy of touch in adjusting the instruments, and these can be taught as easily to new hands as to old ones, indeed in many cases more easily. When sending in the Revised Estimate the magnetic survey party can be included; it will not materially alter the total budget estimate.

6. I would specially point out the desirability of issuing early orders on the subject of Captain Fraser's being deputed to England; I doubt very much whether high class magnetic instruments can be procured ready made, and if not, their construction will take some time; it is therefore of the utmost importance that Captain Fraser should go home as soon as possible so as to ensure our being able to commence work next October.

GOVERNMENT OF INDIA.
DEPARTMENT OF REVENUE AND AGRICULTURE.

METEOROLOGY.

To

THE RIGHT HONOURABLE LORD GEORGE F. HAMILTON,
Her Majesty's Secretary of State for India.

Calcutta, the 30th March 1899.

MY LORD,

IN continuation of our despatch No. 14 of the 2nd February 1899, we have the honour to forward a copy of a letter from our Surveyor General containing proposals for the conduct of the fundamental magnetic survey.

2. We agree with the Surveyor General that it is advisable that the officer to whom the control of operations is to be entrusted should consult Professor Rücker as to preliminary details, and we would therefore ask Your Lordship to sanction the deputation of Captain H. A. D. Fraser, R.E., to England for the purpose for a period of two months from the date of his arrival in England on the usual terms as to free passage and salary, *vide* Articles 103 and 104 of the Civil Service Regulations. Should the two months prove insufficient for the purpose, we recommend that the period of deputation be extended to three months.

3. In the event of Captain Fraser desiring to take leave in Europe on the expiry of his term of deputation, we shall have no objection to the grant of any leave to which he may be entitled subject to the condition that he returns to India by the 1st October. In this case he will not be entitled to a free return passage.

4. We would ask that Your Lordship's orders may be communicated to us by telegram.

We have the honour to be,

MY LORD,

Your Lordship's most obedient and humble Servants,

CURZON OF KEDLESTON.

W. S. A. LOCKHART.

J. WESTLAND.

M. D. CHALMERS.

E. H. H. COLLEN.

A. C. TREVOR.

C. M. RIVAZ.

No. 1067-16-2

COPY of correspondence forwarded to the Finance Department for information.

By order,

~~B. MACDONALD~~

W. M. Bailey
Under-Secretary to the Government of India.

List of Enclosures.

Letter from the Surveyor General of India, No. 677 S., dated 25th February 1899.

Meteorology-91

FILE No. 16 of 1899.

SERIAL No. 2.

No.

1899.

GOVERNMENT OF INDIA.

Department of Revenue & Agriculture.

METEOROLOGY.

No. 27, DATED CALCUTTA, THE 30TH MARCH 1899.

(COPY.)

(*Letter to Her Majesty's Secretary of State
for India.*)

SUBJECT.

DEPUTATION of Captain Fraser of the Survey
of India Department to England in connec-
tion with the fundamental magnetic survey.

GOVERNMENT OF INDIA.

PROCEEDINGS

OF

THE DEPARTMENT OF REVENUE AND AGRICULTURE

FOR

APRIL, 1899.

METEOROLOGY.

REORGANISATION OF THE METEOROLOGICAL DEPARTMENT.

[Proceedings—Nos. 1 to 4.]

FROM

THE METEOROLOGICAL REPORTER TO THE
GOVERNMENT OF INDIA,

To

THE SECRETARY TO THE GOVERNMENT OF INDIA,
REVENUE AND AGRICULTURAL DEPARTMENT.*Simla, the 28th September 1898.*

SIR,

I HAVE the honour to submit the following proposals for the consideration of the Government of India.

2. The proposals are briefly as follows :—

- (1) Reduction of 24 second class observatories to third class, and improvement of work at the remaining second class observatories, and establishment of ten additional observatories.
- (2) Improvement of the Daily Weather Report issued at Simla.
- (3) Temporary and permanent increase of staff of the Simla office.
- (4) Temporary reduction of the clerical staff of the Calcutta office.

3. The first is the gradual reduction of the second class departmental observatories from sixty (60) to thirty six (36) in number. These observatories record observations at 8, 10 and 16 hours. In some cases the observers are wholtime officers; in others Hospital Assistants or Assistant Surgeons. The latter are usually on duty in the morning, and the observations at 8 A.M. and 10 A.M. are generally taken at the exact times, as required. Many of these observers, more especially the wholtime observers, go home after the 10 A.M. observations, in some cases to a distance of one or two miles from the observatory, and then return to take the 4 P.M. observations. As these observations are not telegraphed and are seldom charted, occasional mistakes due to want of punctuality are not as a rule detected, and the observers are aware of this. Many of them hence fall into careless habits and arrive at 4.30 P.M. or even 5 P.M., in fact at any time about 4 P.M. that may suit them, and record the observations at that time as if taken exactly at 4 P.M. The monthly mean values hence frequently show slight discrepancies which are, so far as I can judge, chiefly, if not entirely, due to this cause. There are about 60 in all of these second class observatories maintained by the Government of India and a considerable number of them supply information of little or no value in addition to the 8 hour observations, but which, from the numerous slight errors with which they are tainted, give considerable trouble.

4. The following is a list of the observatories (numbering 24) which I propose to reduce from second class to third class :—

Bengal.

Berhampore. (T)

Narainganj. (T. O.)

Burdwan.

Patna.

Cuttack. (T. O.)

Assam.

Dhubri.		Silchar.
Sibsagar. (T.)		

North-Western Provinces and Oudh.

Agra. (T.)		Lucknow. (T. O.)
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Punjab.

Mooltan. (T.)		Murree. (T.?)
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Central Provinces.

Hoshangabad.		Raipur.
Khandwa.		Saugor.

Central India and Rajputana.

Ajmeer. (T.)		Sutna.
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Bombay and Sind.

Poona. (T.)		Ratnagiri.
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Madras, Mysore and Coorg.

Cochin.		Mercara.
Coçanada.		Trichinopoly.

5. In order to secure more satisfactory observations at the remaining second class observatories, I propose so far as possible to transfer them to Telegraph offices. Telegraph-masters or signallers are (except on Sundays) invariably on duty at the hours 8 A.M., 10 A.M. and 4 P.M. at the important stations where second class meteorological observatories are maintained, and also in most—if not in all—cases live near or in the compounds of the Telegraph offices.

6. The following gives a list of the existing second class observatories (omitting those included in the previous list which it is proposed to reduce) distinguishing those maintained by the Department, from those by native states or other authority by giving the latter in italics.

Bengal.

Chittagong. (T. O.)	|	Hazaribagh.
Darjeeling.	|	Saugor Island. (T. O.)
False Point.	|	

North-Western Provinces and Oudh.

Chakrata. (T. O.)	|	Ranikhet.
Dehra.	|	<i>Muktesar</i> (non-departmental).
<i>Meerut</i> (non-departmental).		Roorkee.

Kashmir.

Leh.		<i>Srinagar</i> (non-departmental).
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Punjab.

Ludhiana. (T.?)		Peshawar. (T.?)
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Central Provinces.

Jubbulpore. (T.?)		Nagpur.
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Berar.

Akola.

Central India and Rajputana.

Mount Abu.

Deesa. (T.)

Udaipur.

Bombay and Sind.

Belgaum. (T.)

Karwar. (T.)

Kurrachee. (T. O.)

Sholapur. (T.)

*Hyderabad (Deccan).**Hyderabad (non-departmental).**Madras, Mysore and Coorg.**Bangalore (non-departmental).*

Bellary. (T.)

Chitaldrug (non-departmental).

Salem.

*Hassan (non-departmental).**Mysore (non-departmental).**Burma.*

Akyab. (T. O.)

Diamond Island. (T. O.)

Rangoon.

Bay Islands.

Port Blair.

Arabia.

Aden.

Perim.

Baluchistan.

Quetta.

Africa.

Zanzibar.

Arabian Sea.

Minicoy.

The stations in the preceding two lists at which the observatories are now located at the Telegraph offices are shown by (T. O.) and those at which it will, so far as I can at present judge, be practicable and easy to transfer the observatories to the Telegraph offices are shown by the addition (T.)

7. Also I propose to provide the great majority of the second class stations with Richard Freres' barographs and thermographs which will give a fairly accurate continuous registration of temperature, pressure and humidity, and hence not only serve as a check on the eye observations but will also furnish data of all unusual meteorological phenomena at whatever hour they may occur. These instruments have only recently been invented and introduced into meteorological observatories in Europe and America. They are cheap and simple in construction and arrangement, and hence very easy to manipulate. They are also, on the whole, very accurate. I have had some carefully tested at Calcutta, Allahabad and Simla, and am fully satisfied with their performance and feel

Enclosure A.

confident that their use will give us much valuable information, at present not obtainable except at the two observatories of Calcutta and Bombay furnished with continuous self-registering instruments. I enclose the traces of Simla for Sunday, the 25th instant, showing very clearly and fully the pressure and temperature changes accompanying the local thunderstorm which occurred on that day about 6 P.M. These traces will show how these instruments record very clearly any brief changes of pressure and temperature at any time in the day accompanying changes of weather, such as, in fact, are rarely shown by the observations taken at the fixed hours, *viz*, 8 A.M., 10 A.M. and 4 P.M. The cost of a set of instruments, (*viz*, a barograph and thermograph) for each station, will not exceed Rs. 350.

8. In making the selection of stations for second class observatories in the future, I have been guided by the following considerations:—

- (1) To provide a sufficient number of observatories which shall, from the accuracy of the observations, give a more correct estimate of the variations of the meteorological conditions from the normal than is possible from the observations of third class observatories alone, and which shall also serve as standard observatories for the comparison of the observations at the neighbouring third class observatories.
- (2) To provide all the more important sea coast observatories with self-registering instruments and thus secure continuous registration of cyclonic phenomena with a view to throwing further light upon the constitution of cyclones—more especially of the calm centre. At the present time there is not a single station on the coasts of the Bay of Bengal provided with self-registering instruments and hence our knowledge of cyclonic phenomena is based only on eye observations recorded at critical periods during stormy, and in some cases dangerous, weather. Progress in our knowledge of the constitution and dynamics of cyclonic storms is hence extremely slow, much slower than it ought to be. It will however, I believe, be much facilitated by this change.
- (3) To maintain or convert all important hill observatories and also the nearest plain observatories into second class observatories furnished with barographs and thermographs by Richard Freres and thus have a continuous comparative record of the meteorology of these stations in order to provide data from which to work out the meteorological relations and alternating air movement between the hills and plains. This will probably lead to a further development of the employment of the variation data of hill or mountain observatories for the work of seasonal forecasting.

9. These changes cannot be carried out at once. The 24 observatories it is proposed to abolish may be reduced with effect from 1st January. The provision of instruments for the remaining second class observatories I propose to spread over the next 3 years, as also any changes necessitated by the removal of observatories to Telegraph offices, including, where necessary, the erection of sheds and the comparisons between the old and new sites in order to obtain corrections to modify the normal values of temperature of the old sites to the new sites. As the pay of our observers at third class stations is Rs. 8 less per mensem than at second class stations these changes will effect a monthly saving of 24 times 8 rupees or Rs. 192.

10. I also propose to close, with the sanction of the Jeypore state the meteorograph at the Jeypore Observatory and to furnish it with a Richard Freres' barograph and a Richard Freres' thermograph. The meteorograph is a very troublesome instrument and not at all satisfactory. The motive power is electricity, and it is necessary for the instrument to be under the constant supervision of a trained electrician. By an arrangement sanctioned some years ago the Telegraph-master at Jeypore is paid Rs. 30 per mensem by the Department to secure the supervision necessary for the proper working of the instrument. If the proposal to substitute Richard Freres' barograph and thermograph for the meteorograph be accepted, there will be a further saving of Rs. 30 per mensem, making with the previous a total saving of Rs. 222 per mensem.

11. The observers at the second class departmental observatories provided with the Richard self-recording instruments should receive a small increase of pay

for this additional work of, say, Rs. 5 a month extra, thus increasing their pay from Rs. 18 to Rs. 23. As these observatories would ultimately number from twenty-four to thirty this would involve an increase of pay of not less than Rs. 120 per mensem and not exceeding Rs. 150 per mensem, or say approximately Rs. 135 per mensem.

12. I think it would be desirable to take the present opportunity to make some slight additions to our observatories, chiefly in Assam. I would suggest—

- | | |
|---|-------------|
| (1) Cherrapunji | } in Assam. |
| (2) Shillong. | |
| (3) Tezpur. | |
| (4) Gauhati. | |
| (5) Dibrugarh or Sadiya | |
| (6) A station about midway between Bilaspur and Katni in the Central Provinces. | |
| (7) The summit of the Chor Peak between Simla and Chakrata. | |

13. Assam is very imperfectly represented in our present system, and it would be very desirable to extend observatories in that province at the present time. **Enclosure B.** I append a map giving the observatories at present in operation and those that I propose to establish shortly. The map shows at once the blank areas so far as meteorological representation is concerned. Some of these blanks cannot be filled up at present, as there are neither telegraph lines nor railways in these areas, and it is not advisable to establish more observatories except at telegraphic stations. Four third class observatories at Shillong, Tezpur, Gauhati and Sadiya are necessary to fill up the gap in Assam. Also Cherrapunji is an unique station from its excessive rainfall, and it would be most interesting to establish an observatory there and work out more fully than has yet been done the meteorology of the excessive downpours at that station. A third class observatory at some station on the railway line between Bilaspur and Katni would help to fill up a gap in the large area including the western districts of Chota Nagpur and the north-eastern districts of the Central Provinces.

A Pros., July
1891, Nos. 1
to 5.

14. I am also very anxious, in view of its great importance, to extend the work of mountain meteorological observations. The Madras Government has arranged to establish observatories at Ootacamund and the summit of Dodabetta and an observatory will be shortly opened at Kodaikūnal. This will considerably extend our work in this direction in Southern India. I should like to see an extension in the Himalayas, where it has been diminished by the untimely closure of the Gnatong Observatory at an elevation of 11,000 feet in Sikkim. Observatories on the crests of mountain ridges (and not in valleys) up to as great an elevation as possible and as near to the plains as possible are urgently required for progress in our knowledge of the upper air movements. I hence propose as a commencement the establishment of an observatory on the summit of the Chor to be provided with self-registering instruments. I have not yet visited the Chor, but I am informed that there would be no great difficulty in arranging for an observatory on that peak. At present our observatories at the same distance as the Chor from the plains are at elevations not exceeding 7,200 feet. An observatory on the Chor would extend our observations nearly 5,000 feet higher. It would be in an admirable position, and a comparison of its results with those at Simla, Chakrata, Dehra, Umballa, Ludhiana and Roorkee would almost certainly yield scientific results of great importance. I cannot give an exact estimate of the cost of establishing or maintaining a suitable observatory there, but submit my proposal in the rough for the consideration of Government, so that, if it be approved in principle, I may then arrange to visit the Chor and submit, if possible, a practicable scheme.

15. The cost of the proposed six third class observatories in Assam and the Central Provinces at the ordinary rates would be Rs. 60 per mensem and of the observatory on the Chor almost certainly not more than Rs. 40 per mensem and probably less.

The increase under this head would be—

	Rs.
Increase of pay at (probably 27) second class observatories at Rs. 5 per mensem	135
Pay of observers at 6 new third class observatories ...	60
Pay of observers for the observatory on the Chor peak ...	40
Total ...	235

This increase is practically identical with the savings effected by the reduction of 24 second to third class observatories and the abolition of the special allowance to the Telegraph Master at Jeypore, *viz.*, Rs. 222. The reduction might be immediate, whereas the increase would be spread over the next three years and the savings thus effected would probably be almost sufficient to pay for any series of comparative observations and for the erection of the sheds necessitated by the changes.

16. The second proposal I have to make is to add two small charts at the foot of the present chart in the India Daily Weather Report showing the variations of temperature and pressure from the normal. The chart at present published shows the actual meteorological conditions at 8 A.M. of the day under report as given by the pressure, wind and rainfall observations. In studying the weather it is, however, quite as important to consider the variations of the actual conditions from those normal to the period as the actual conditions themselves. Hence the various columns in the Daily Weather Report giving variation data are really the most important features of that report, not only to the meteorologist, but to any one wishing to use the meteorological data for any purposes of comparison or for forecasting future weather. It is, for example, only by the study of charts embodying these data that the progress of warm and cool waves can be realized, or the intensity of a cyclonic depression and storm judged. I add to this letter a copy of the daily weather reports for the period 1st to the 5th March 1898 with the proposed additions showing the progress of the most remarkable cool wave of the present year across Northern India.

Enclosure C.

In order to carry out the suggestion it will be necessary to increase the office establishment by an extra draughtsman whose chief work will be to prepare the two small charts daily on lithographic transfer paper. A suitable draughtsman could be obtained probably on Rs. 35—3—50. This will of course be a real and unbalanced increase of expenditure, but the additional information the charts will convey at a glance to the recipients of the Daily Weather Report will, I hope, justify the slight increase.

17. The third proposal or rather series of proposals has for its main object to utilize Mr. Dallas and my services in such a way as to give larger and more useful results than are possible with present arrangements, and also to lead up to the arrangements which will be necessitated by my retirement.

A Pros., Aug.
1898, Nos. 1
and 2.

18. Mr. Dallas is now drawing Rs. 1,000 per mensem and has applied for a further increase which will probably be granted. His chief work is the preparation of the Daily Weather Report and of certain weekly and monthly reports. This work could be done under his supervision or mine by a non-gazetted officer on Rs. 400 or Rs. 500. Mr. Dallas is drawing the pay of an officer of high standing, and it would hence be better in every way for the Government to employ him during the remaining years of his service in carrying out important investigations for which he is fully qualified. After his service of 16 years in the Department, he has acquired experience and knowledge of certain parts of Indian meteorology which it would be very desirable to utilize before he retires. One large and important piece of work which he could carry out is to tabulate, and discuss the data of the Bay of Bengal and Arabian Sea which are being collected and published in full in the Indian Monsoon Area Daily Weather Reports, and to prepare pilot charts for the Indian Seas similar to those published by the American Hydrographic Office. Certain English authorities, I believe, raised the question of the publication of these charts sometime ago, but it was not then found possible to make arrangements for their preparation. The charts would be of great service to mariners, and I think it would be very desirable to take the opportunity of utilizing Mr. Dallas' services for this matter at least, so that this work would be completed before his retirement.

This arrangement would enable the one important piece of work for which the services of a whole-time Assistant Reporter of Mr. Dallas' status would be necessary to be completed, and hence probably do away with the necessity for the re-appointment of such an officer for many years.

19. I have a series of investigations in hand which I hope to complete during the next nine or twelve months. I then propose to re-write the Hand-book of Cyclonic Storms in the Bay of Bengal which has been completely sold out. This will give me the opportunity of bringing its information up to date, and I hope to make it more useful than hitherto to mariners. After this work is completed, I propose to take up the observations of all the Indian stations for the twenty-five years 1875-1899, and obtain the most probable normal annual, monthly and daily values of the elements of observations which will serve as a standard for my successor for at least 10 years and probably 20 years. I then propose to utilize these results in preparing an atlas illustrating fully the meteorology of India and writing a scientific manual of that subject utilizing the whole of the information collected during the past twenty-five to thirty years, and from which a simple manual can be easily prepared for the use of students in colleges and the general public. This work would be, I think, of considerable value, and the time has come when it can be prepared.

20. It appears to me that it will be most desirable, advantageous and economical for the Government of India to avail themselves of the accumulated experience of Mr. Dallas and myself, and to have these important investigations and discussions carried out during the next few years. In order to enable us to carry them out satisfactorily and without delay, it will be necessary to increase temporarily to some slight extent the clerical establishment in the Simla Office, and also to relieve us of a part of our present duties. This extension will give the Government the opportunity of making arrangements which will obviate the difficulties that will otherwise arise when Mr. Dallas and I retire. I expressed, some years ago, my views as to what would, I think, judging from my long experience, be the best working constitution in future for the staff of the India Meteorological Department. These were stated in a confidential memorandum, dated 2nd June 1891, of which I enclose a copy for reference. Further experience, I may add, has confirmed the views I then expressed.

21. Mr. Dallas has, I believe, been unofficially informed that the Government of India has no present intention of appointing him as my successor. That opinion I presume does not necessarily bar the consideration of his claims when the time arrives for the appointment of my successor. There are hence so far as I can judge three courses open to Government in this matter. These are:—

1st—To appoint Mr. Dallas as my successor.

2nd—To select a successor from the provincial reporters and hence from Messrs. Little, Murray, Kuchler and Gilliland.

3rd—To obtain a successor from England with the necessary mathematical and scientific qualifications. It would be desirable that he should be comparatively young and that he should have had practical experience in the actual work of observation in magnetic, solar physics and astronomical observatories.

22. As Mr. Dallas will be about 50 years of age when I complete the last extension granted me by the Government of India, his appointment would probably only postpone for five years the difficulty which will arise from the control of the Department being transferred from officers with many years' experience to officers of little or no experience.

23. With respect to the third method of filling up the appointment, there is some risk in obtaining an officer from England, but this would probably be minimized in the present case by consulting the Observatories' Committee through the Secretary of State.

24. In any case, either immediately or shortly after my retirement, the India Meteorological Office will necessarily have inexperienced officers instead of officers like Mr. Dallas and myself who have largely contributed to the development

of the Department, and acquired the experience and judgment necessary for the work of forecasting in India in its various branches.

25. In my confidential note I pointed out the various objections to the present arrangement of two whole-time gazetted officers, and I need not repeat them, nor the difficulties to which this arrangement has given rise.

26. The work now thrown on me is very large, and has been much increased by recent changes. The number of observatories, departmental or working in connection with the Department, has increased during my régime from 135 in 1887 to 227 in 1898, and the work of administration has hence been largely increased. In addition the gradual centralization which has occurred due to the imperialization of the Department has also increased my work. Three out of the four provincial reporters now issue daily weather reports, and hence are no longer available for the work of inspection. The daily weather report work at Simla renders Mr. Dallas' services unavailable for inspection. Hence more and more of this work is thrown on myself.

In addition, during the past five or six years, a considerable part of my time has been spent in advising Government with respect to the scientific but non-departmental observatories of Madras, Kodaikanal and Bombay, and in visiting these observatories to learn the conditions of their working, and in drawing up reports and schemes called for by Government. My time is hence very fully occupied and to such an extent that I doubt whether it would be possible for an officer without my experience to carry out the work. The investigations in which I am engaged have to be carried out in a hasty manner in occasional intervals of leisure and are hence much less satisfactory and complete than I should like them to be. Hence, if the Government of India wish to use my experience and knowledge in the most advantageous manner, it should relieve me of much of the work of inspection and of the easier administrative work, and this can only be done by strengthening and increasing the Simla Office. It has in my opinion become almost absolutely necessary that this should be done :—

1st.—To enable Mr. Dallas and myself to carry out the larger investigations I propose.

2nd.—To smooth and prepare for the transfer of the Department from the superintendence and control of an experienced to that of an inexperienced officer.

27. In my confidential note I recommend as the best arrangement for the higher Staff of the Department the continuance of the local or provincial Reporters as at present and the appointment of a fully qualified scientific officer as the Head of the Department with the assistance of, say, three or four non-gazetted officers of the stamp of the higher subordinate officers in the Survey and similar Departments. They would be quite competent under the guidance and control of the Imperial Reporter to prepare the daily weather report, warn for floods, storms, etc. The field of selection of the Imperial Reportership would hence after the retirement of the present whole-time officers lie between the Provincial Reporters and scientific men in England, and the difficulties introduced by the appointment of an officer of the standing of Mr. Dallas would be avoided in future. If this be accepted, it would be well to make a commencement early, so that if, when I retire, my successor should be appointed from England, there might be at least two subordinates fully qualified to carry on the ordinary report and warning work at Simla.

It is unnecessary to enlarge upon the advantages of this. It would be some time before a successor appointed from England would learn the administration and work of the Department and acquire the knowledge of the facts of Indian meteorology necessary to enable him to control the Department in every respect. It would only be necessary so long as Mr. Dallas remains to have two such subordinate officers, and on his retirement to increase the number to three.

28. I would hence propose that the following appointments should be created and sanctioned ;—

(1) First Assistant to the India Meteorological Reporter ;

(2) Second Assistant to the India Meteorological Reporter ;

and that their pay should be, as suggested in my confidential memorandum, *viz.*, Rs. 400—20—500 for the First Assistant and Rs. 250—20—350 for the Second Assistant.

A Pros., May
1894, Nos. 11
to 20.

For the First Assistant's post I would recommend Mr. W. H. Bion, Astronomer, Jugga Row Observatory. He acted for Mr. Dallas when on furlough in 1893, and proved to be quite capable of preparing the Daily Weather Report and carrying on the current duties of the Simla office.

As Second Assistant, I would suggest Lala Hem Raj, at present my Personal Assistant. He has proved a most useful and energetic assistant, and fully understands the whole routine of the Department, and deserves the promotion by his services. His promotion would enable me to abolish the Personal Assistantship, the pay of which is Rs. 100—10—150.

This addition to the Simla office would have an additional advantage. It would enable me to carry out certain classes of observations which I have been asked to undertake by the Solar Physics Committee of the Royal Society. The following extract from a letter will explain briefly what is desired by the Committee.

"The Committee consider it of importance that a series of observations should be made at Simla, under your superintendence, with Mr. Wilson's duplex form of Boys's Radiomicrometer, and they would suggest that this instrument should be tried with blue and with blue-green light. The Committee also consider it desirable that a series of observations should also be made with a photo-chemical actinometer, and I am to observe that such an instrument can be forwarded to you should you be willing to undertake these observations."

These observations cannot be carried out by the present native observers in my Simla office but could be carried out by Mr. Dallas or Mr. Bion if the changes and additions to my Simla office proposed are sanctioned.

29. In addition I beg to suggest the appointment of a permanent inspector of observatories. The present arrangement of utilizing the services of certain head clerks and chief observers has not proved quite satisfactory, and it has failed entirely to secure inspection in Burma or at the Extra Indian stations, many of which at the present time require inspection badly. I think I can obtain a suitable man on Rs. 50 to 75 per mensem. It would be best to appoint him temporarily for one year on Rs. 50 per mensem, and only to convert him into a permanent officer if he is found to be reliable and unassuming, and does his inspecting work satisfactorily.

30. These additions will add to the cost of the Department at present, but will lead to the abolition in a few years of Mr. Dallas' appointment, and hence to a considerable saving ultimately. In addition the pay of the India Meteorological Reportership could be reduced (probably by Rs. 200) on my retirement, and this future reduction may also perhaps be placed against the pay of the three officers whose appointment I now propose.

31. The immediate increased cost under this head is shown below:—

					Rs.
Pay of First Assistant	400—500	...	...		466½
Pay of Second Assistant	250—350	...	...	...	325
Pay of Inspector	50—75	...	...	...	68½
					—
					860½
Deduct pay of Personal Assistant	100—150			...	137½
					—
					723 about.

32. In order to provide for the extension (temporary) of the Simla Office to enable Mr. Dallas and myself to make the investigations we can carry out before our retirement I propose to reduce temporarily the Calcutta Office. At present several

of the clerks at Calcutta are solely employed in preparing data for our investigations. It is not always possible to give by letter such clear and precise instructions as to avoid all possibility of mistake. There are, in fact, frequent mistakes made, due to imperfect or mistaken apprehension of instructions which lead not only to great and unnecessary delay, but also involve a considerable waste of clerical labour.

33. If Mr. Dallas and I are to carry out the investigations as proposed during the remainder of our service properly and without waste of time, it is essential we should be provided with a sufficient special clerical staff in the Simla Office to prepare and tabulate the data, required for investigations. As the work is essentially temporary and will not extend over more than three to five years, it will be sufficient to engage temporary clerks for that period. They can be provided for by the temporary reduction of the Calcutta Office which is at present possible. This temporary reduction can be effected without in any way impairing the efficiency of the Calcutta Office. The reduction of twenty-four second class to third class observatories will diminish the work of tabulation in the Calcutta Office by that of two men. Five clerks are at present chiefly engaged at Calcutta in doing special work for my investigations, in fact work which is of the same character, as I am now proposing shall be done temporarily at Simla during the remainder of my service. The Calcutta Office can hence be diminished by seven clerks, provided an equivalent number of temporary clerks are sanctioned for my Simla Office to carry out under more efficient conditions the work hitherto performed at Calcutta.

34. A considerable number of the clerks in the Calcutta Office are approaching the period when they can take pension and are willing to do so at once, giving as their main reason that they have had no promotion for many years, and there is no chance of promotion in a small office and department such as the Meteorological Department.

The following gives a list of these clerks :—

Name of clerk.	Name of post.	Pay of grade.				Present holder's pay.	Active service on 31st December 1897.				Pension due on 1st January 1898.		
		Rs.	Rs.	Rs.	A.	Rs.	Y.	M.	D.		Rs.	A.	P.
Khatte Mohan ...	Draftsman ...	40	50	47	8	50	29	1	0		25	0	0
Srish Chander ...	1st class Tabulator	40	55	51	4	55	22	2	0		20	2	8
Kidar Nath, I ...	Do. do. ...	40	55	51	4	55	20	8	0		18	5	4
Mitra ...	Do. do. ...	40	55	51	4	55	24	7	24		22	0	0
Soshi ...	Do. do. ...	40	50	47	8	50	18	7	0		15	0	0
Abinash ...	2nd class Tabulator	30	40	37	8	40	19	9	0		12	10	8
Kidar Nath, II ...	Do. do. ...	30	40	37	8	40	18	11	25		12	0	0

It will be necessary to give these men due notice, and hence the date of their retirement might be fixed when most suitable to themselves and the office. It is difficult to estimate the amount of the savings effected by the retirement of these clerks, as it is not fair to deduct the full amount of a temporary charge for pension (probably provided for in other grants) against a permanent saving in salaries.

35. The actual increase of establishment, permanent and temporary, I would propose for the Simla Office, is as follows :—

Permanent.

1 Draughtsman for Daily Weather Chart Extension

Rs.

... 35 to 50

Temporary.

(1) For Mr. Dallas' special work—

1 Draughtsman	...	...	...	...	...	30
1 Clerk	...	...	...	...	...	65
1 "	...	...	...	...	...	45

(2) For Meteorological Reporter's special work—

2 Clerks each	...	...	...	...	...	45
1 Clerk	...	...	...	...	...	30

The cost of this extension of the Simla Office would be Rs. 306-4-0, or nearly Rs. 26 less than the savings in the Calcutta Office, and hence be amply covered by these savings.

36. The proposals are to some extent made in the rough, but it will be seen that, with the exception of the extension of the higher staff of the Simla Office, they involve practically no increase of expenditure, and also that the real increase due to the extension of the Simla Office will be fully met from savings in the future, and for which they form an adequate preparation. If they are adopted in principle I shall of course be prepared to submit without delay more definite proposals under each of the four heads.

I have the honor to be,

SIR,

Your most obedient Servant,

JOHN ELIOT,

Meteorological Reporter to the Govt. of India.

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, APRIL, 1899.

Reorganisation of the Meteorological Department.

[Pros. No. 2]

No. 2.] No. 3291—57-2, dated Simla, the 28th November 1898.

Serial No. 2.

*From—E. MACONOGHIE, Esq., Under-Secretary to the Government of India,
To—The Meteorological Reporter to the Government of India.*

I AM directed to acknowledge the receipt of your letter No. 553 S., dated the 28th September 1898, with which you submit proposals for the reorganisation of the Meteorological Department.

2. In reply I am to say that the scheme of reorganisation described will require the sanction of Her Majesty's Secretary of State *as a whole*, and in order to enable the Governor General in Council to clearly see its financial effect a proposition statement showing all the establishment changes (including those in the number and pay of observers) should be submitted.

2. The 24 observatories referred to in paragraph 9 of your letter under reply and the Meteograph mentioned in paragraph 10 may be closed from the 1st January 1899. With regard to the proposed provision of certain instruments for the remaining 2nd class observer, an approximate estimate of the cost of the instruments and also of the expenditure on buildings and other fittings for the proposed new observatories should be furnished. Preliminary arrangements for establishing the observatories mentioned in paragraphs 12, 13, and 14 may be made. I am, however, to enquire whether the cost of an observatory in the Chor can be safely estimated not to exceed R40 a month.

No. 3792—57-2.

Copy forwarded to the Finance Department for information.

No. 3.]

No. 22 S., dated Simla, the 7th January 1899.

From—JOHN ELIOT, Esq., *Meteorological Reporter to the Government of India,*
To—*The Secretary to the Government of India.*

I HAVE the honour in reply to your No. 3291—57-2, dated the 28th November 1898, to submit a proposition statement showing all the establishment changes (including those in the number and pay of observers) duly verified by the Comptroller of India Treasuries.

2. With respect to his remarks the omission in the case of Nagpur has been filled up. I have left the second omission, as it is probably sufficient to leave the entry as it stands, subject to the correction stated by the Comptroller, as the separation of the two offices at Calcutta which will take place when the India Meteorological Office moves to its new quarters in November next will necessitate a revision of the Bengal office establishment and the appointment of a Head Clerk, and I shall have to come up later with proposals under this head.

3. I have in accordance with the sanction contained in paragraph 3 of your letter reduced 22 of the second class observatories. I had not time before preparing and submitting the scheme to consult the local authorities. I have since done so, and ask for sanction to the reduction of Jubbulpore to third class and the retention of Khandwa as a second class observatory as suggested by the Sanitary Commissioner, Central Provinces. I have the honour also to ask that the reduction of Poona and Cocanada to third class may be postponed for a year at least in order to enable some arrangement to be made for the whole-time observers there.

4. It has also been suggested by Dr. P. D. Pank, Agency Surgeon, Jeypore, and his predecessor, Dr. T. H. Hendley, that it would be inadvisable to discontinue the working of the meteorograph at Jeypore without fully consulting with the Durbar. I have hence to ask that the reduction on account of the meteorograph may be postponed for one year, and that the Telegraph Master, Jeypore, be granted his allowance of Rs30 per mensem for keeping the meteorograph in order until 31st December 1899.

5. I have already provided a small number of first and second class observatories with Richard barographs and thermographs. In order to equip the remaining second class observatories, I estimate that 24 barographs and 20 thermographs will be required. The following would be the cost of these instruments:—

	R
24 barographs, at Rs125 each	3,000
20 thermographs, at Rs215 each	4,300
Total	<u>7,300</u>

As this expenditure would be spread over three years the annual cost for these instruments would be less than Rs2,500 and would be in part met by other savings in the annual indent for instruments sent to the Secretary of State.

6. The cost of erecting the six sheds required at the proposed observatories in Assam and the Central Provinces would be about Rs200 each, or in all about Rs1,200, and of the shed on the top of the Chor probably not more than Rs500, making in all Rs1,700.

7. In reply to your last query whether the cost of maintaining an observatory on the Chor can be safely estimated not to exceed Rs40 per mensem, I have the honour to state that I have not as yet visited that peak, but I propose to do so shortly, and if I find it is not possible to establish an observatory for the amount proposed, *viz.*, about Rs500 for buildings and Rs40 per mensem for observer and peon, I shall withdraw my proposals for its establishment. I have, however, consulted with Mr. Ribbentrop and others. Mr. Ribbentrop is fully acquainted with the peak, and assured me that he thought there would be no difficulty in establishing an observatory at a moderate cost. I shall submit definite proposals as soon as I have visited the peak.

8. I have also the honour to point out that it will probably be most satisfactory to give some of the temporary posts (which it is proposed, in paragraph 35 of my letter No. 553S. of the 28th September last, to create) to clerks in my Simla office who are more or less fully acquainted with the reduction of meteorological observations, and to ask that the services of these clerks in the temporary appointments may be allowed to count as permanent service, whilst the services in the posts they temporarily vacate and which will be filled up by clerks appointed in their place may count as temporary. If this suggestion be sanctioned, it will enable me to utilize two or three of the sharper men in the lower grades of my office for these temporary posts without inflicting upon them the penalty of forfeiting their previous permanent services for pension.

PROPOSITION STATEMENT.

G. I. C. P. O.—No. 897 R. & A.—17-2-99—30.—G .R.

GOVERNMENT ORDERS.		Office to which Proposition refers.	NATURE OF CHARGES.						PROPOSITION.				Grounds of Proposition.	ORDERS OF THE GOVERNMENT OF INDIA.		
			PRESENT SCALE.			PROPOSED SCALE.			PERMANENT.		TEMPORARY.			HOME DEPARTMENT.	FINANCIAL DEPARTMENT.	
			No.		R a. p.	No.		R a. p.	Increase per month.	Decrease per month.	Increase per month.	Decrease per month.			Remarks.	Remarks.	Orders.
No.	Date.		No.		R a. p.	No.		R a. p.	R a. p.	R a. p.	R a. p.	R a. p.				
Govt. of India, Rev. and Agri. Dept., No. 29—1-7 Met.	14th Feb. 1839.	Meteorological Office, India, Calcutta.	1	Head Clerk (R150—200)	187 8 0	1	Head Clerk (R150—200)	187 8 0								
Ditto ditto . . .	Ditto . . .				Personal allowance to Head Clerk.	50 0 0		Personal allowance to Head Clerk.	50 0 0							
Ditto ditto . . .	Ditto . . .		2	1st class Assistants (R40—55 each).	102 8 0	2	1st class Assistants (R40—55 each).	102 8 0								
Ditto ditto . . .	Ditto . . .		1	1st class Assistant (R45—55)	52 8 0	1	1st class Assistant (R45—55)	52 8 0								
Govt. of India, Rev. and Agri. Dept., No. 372—Met. C.	13th Mar. 1890.		1	Ditto (R40—55)	51 4 0	1	Ditto (R40—55)	51 4 0								
Govt. of India, Rev. and Agri. Dept., No. 922—31.	28th Mar. 1895.				Personal allowance to J. L. De.	15 0 0		Personal allowance to J. L. De.	15 0 0							
Govt. of India, Rev. and Agri. Dept., No. 29—1-7 Met.	14th Feb. 1889.		3	2nd class Assistants (R30—40 each).	112 8 0	3	2nd class Assistants (R30—40 each).	112 8 0								
Govt. of India, Rev. and Agri. Dept., No. 922—31.	28th Mar. 1895.		1	3rd class Assistant (R20—30)	27 8 0	1	3rd class Assistant (R20—30)	27 8 0								
Govt. of India, Rev. and Agri. Dept., No. 29—1-7 Met.	14th Feb. 1889.		1	3rd ditto (ditto)	27 8 0	1	3rd ditto (ditto)	27 8 0								
Ditto ditto . . .	Ditto . . .		1	Computer (R70—90)	85 0 0	1	Computer (R70—90)	85 0 0								
Govt. of India, Rev. and Agri. Dept., No. 189—1-7 Met.	5th May 1890.				Personal allowance to Computer.	25 0 0		Personal allowance to Computer.	25 0 0							
Govt. of India, Rev. and Agri. Dept., No. 29—1-7 Met.	14th Feb. 1889.		1	2nd Computer (R50—65)	61 4 0	1	2nd Computer (R50—65)	61 4 0								
Ditto ditto . . .	Ditto . . .		1	Draughtsman (R40—50)	47 8 0		...	...		...	...		47 8 0			
Ditto ditto . . .	Ditto . . .		2	Draughtsmen (R30—40 each)	75 0 0	2	Draughtsmen (R30—40 each)	75 0 0								
Ditto ditto . . .	Ditto . . .		7	1st class Tabulators (R40—55 each).	358 12 0	4	1st class Tabulators (R40—55)	205 0 0			...		153 12 0			
Govt. of India, Rev. and Agri. Dept., No. 957—8-7.	13th May 1891.		1	1st class Tabulator (R40—50)	47 8 0		...	...			...		47 8 0			
Govt. of India, Rev. and Agri. Dept., No. 372—Met. C.	13th Mar. 1890.		1	2nd class Tabulator (R35—50)	46 4 0	1	2nd class Tabulator (R35—50)	46 4 0								
Govt. of India, Rev. and Agri. Dept., No. 29—1-7 Met.	14th Feb. 1889.		10	2nd class Tabulators (R30—40 each)	375 0 0	10	2nd class Tabulators (R30—40 each).	375 0 0								
Govt. of India, Rev. and Agri. Dept., No. 372—Met. C.	13th Mar. 1890.		3	Ditto (ditto)	112 8 0	2	2nd class Tabulators (R30—40 each).	75 0 0	...	...	...		37 8 0			
Govt. of India, Rev. and Agri. Dept., No. 178—3.	30th Jan. 1892.		1	2nd class Tabulator (ditto)	37 8 0		...	...	...	...	...		37 8 0			
Govt. of India, Rev. and Agri. Dept., No. 29—1-7 Met.	14th Feb. 1889.	4	3rd class Tabulators (R20—30 each).	110 0 0	4	3rd class Tabulators (R20—30 each).	110 0 0									
Govt. of India, Rev. and Agri. Dept., No. 367—8-7.	13th May 1891.	Meteorological Office, India, Calcutta.	1	3rd class Tabulator (R20—30).	27 8 0	1	3rd class Tabulator (R20—30)	27 8 0								
Govt. of India, Rev. and Agri. Dept., No. 3296—4.	24th July 1894		2	Ditto	55 0 0	2	Ditto	55 0 0								
Govt. of India, Rev. and Agri. Dept., No. 29—1-7 Met.	14th Feb. 1839.		1	Daftri	9 0 0	1	Daftri	9 0 0								
Ditto ditto . . .	Ditto . . .		1	Ditto	8 0 0	1	Ditto	8 0 0								
Govt. of India, Rev. and Agri. Dept., No. 372—Met. C.	13th Mar. 1890.		1	Peon	9 0 0	1	Peon	9 0 0								
Govt. of India, Rev. and Agri. Dept., No. 29—1-7 Met.	14th Feb. 1889.		3	Peons at R8 each . . .	24 0 0	3	Peons at R8 each . . .	24 0 0								
Ditto ditto . . .	Ditto		2	Ditto at R7 „ . . .	14 0 0	2	Ditto at R7 „ . . .	14 0 0								
Ditto ditto . . .	Ditto		1	Darwan	7 0 0	1	Darwan	7 0 0								
Ditto ditto . . .	Ditto		2	Farashes at R7 each . .	14 0 0	2	Farashes at R7 each . .	14 0 0								
Govt. of India, Rev. and Agri. Dept., No. 3055—79-2.	29th Dec. 1896.		1	Sweeper	9 0 0	1	Sweeper	9 0 0								
					Daily Weather Report Establishment.											
Govt. of India, Rev. and Agri. Dept., No. 1249—27-3.	18th May 1896.		1	Pressman	15 0 0	1	Pressman	15 0 0								
Ditto ditto . . .	Ditto		1	Spongeman	10 0 0	1	Spongeman	10 0 0								
Ditto ditto . . .	Ditto		2	Workmen at R7 each . .	14 0 0	2	Workmen at R7 each . .	14 0 0								
Ditto ditto . . .	Ditto	3	Peons at R7 each . . .	21 0 0	3	Peons at R7 each . . .	21 0 0									
			Total	2,244 0 0			1,920 4 0	...	...	...		323 12 0				

GOVERNMENT ORDERS.		Office to which Proposition refers.	NATURE OF CHARGES.						PROPOSITION.				Grounds of Proposition.	ORDERS OF THE GOVERNMENT OF INDIA.		
No.	Date.		PRESENT SCALE.			PROPOSED SCALE.			PERMANENT.		TEMPORARY.			HOME. DEPART. MENT.	FINANCIAL DEPARTMENT.	
			No.		R a. p.	No.		R a. p.	Increase per month.	Decrease per month.	Increase per month.	Decrease per month.			Remarks.	Remarks.	Orders.
			No.		R a. p.	No.		R a. p.	R a. p.	R a. p.	R a. p.	R a. p.				
Govt. of India, Rev. and Agri. Dept., No. 29—1-7 Met.	14th Feb. 1889 .	Meteorological Office, India, Simla.	1	Personal Assistant to the Meteorological Reporter to the Government of India (R100—150).	137 8 0	...	...	...	...	137 8 0						
Govt. of India, Rev. and Agri. Dept., No. 182—73-3.	21st Jan. 1898 .		1	Head Clerk (R100—125) .	118 12 0	1	Head Clerk (R100—125) .	118 12 0								
Govt. of India, Rev. and Agri. Dept., No. 922—31.	28th Mar. 1895		1	Computer (R75—100) .	92 12 0	1	Computer (R75—100) .	93 12 0								
Govt. of India, Rev. and Agri. Dept., No. 372—Met. C.	13th Mar. 1890		3	Tabulators (R50—70 each) .	195 0 0	3	Tabulators (R50—70 each) .	195 0 0								
Ditto ditto	Ditto		3	Ditto (R35—50 each) .	138 12 0	3	Ditto (R35—50 each) .	138 12 0								
Ditto ditto	Ditto		6	Ditto (R25—35 each) .	195 0 0	6	Ditto (R25—35 each) .	195 0 0								
Govt. of India, Rev. and Agri. Dept., No. 1104—17.	5th April 1893 .		1	Tabulator (R25—35) .	32 8 0	1	Tabulator (R25—35) .	32 8 0								
Govt. of India, Rev. and Agri. Dept., No. 922—31.	28th Mar. 1895		1	Ditto ditto	32 8 0	1	Ditto ditto	32 8 0								
Govt. of India, Rev. and Agri. Dept., No. 29—1-7 Met.	14th Feb. 1889 .		1	Draughtsman (R50—70) .	65 0 0	1	Draughtsman (R50—70) .	65 0 0								
Ditto ditto	Ditto		1	Ditto (R40—50) .	47 8 0	1	Ditto (R40—50) .	47 8 0								
Ditto ditto	Ditto		1	Ditto (R30—40) .	37 8 0	1	Ditto (R30—40) .	37 8 0								
Govt. of India, Rev. and Agri. Dept., No. 922—31.	28th Mar. 1895		1	Ditto (R25—35) .	32 8 0	1	Ditto (R25—35) .	32 8 0								
Govt. of India, Rev. and Agri. Dept., No. 1104—17.	5th April 1893 .		1	Daftri (R10—15)	13 12 0	1	Daftri (R10—15)	13 12 0								
Govt. of India, Rev. and Agri. Dept., No. 372 Met. C.	13th Mar. 1890		1	Peon	10 0 0	1	Peon	10 0 0								
Govt. of India, Rev. and Agri. Dept., No. 29—1-7 Met.	14th Feb. 1889 .		4	Peons (at R8 each)	32 0 0	4	Peons (at R8 each)	32 0 0								
Govt. of India, Rev. and Agri. Dept., No. 1104—17.	5th April 1893 .		1	Farash	10 0 0	1	Farash	10 0 0								
Govt. of India, Rev. and Agri. Dept., No. 29—1-7 Met.	14th Feb. 1889 .		1	Sweeper and Bhisti	2 0 0	1	Sweeper and Bhisti	2 0 0								
			1	First Assistant to the Meteorological Reporter, India (R400—500).	475 0 0	475 0 0										
			1	Second Assistant to the Meteorological Reporter, India (R150—10—250).	200 0 0	200 0 0										
			1	Inspector of Meteorological Observations (R50—75).	68 12 0	68 12 0										
			1	Draughtsman (R35—50) .	46 4 0	46 4 0										
			1	Ditto	30 0 0	...				...	...	30 0 0				
			1	Clerk	65 0 0	...				...	...	65 0 0				
			3	Clerks (at R45 each)	135 0 0	...				...	...	135 0 0				
			1	Ditto	30 0 0	...				...	...	30 0 0				
				TOTAL .	1,194 0 0			TOTAL .	2,106 8 0	790 0 0	137 8 0	260 0 0				

CALCUTTA,

The 22nd December 1898.

JOHN ELIOT,

Meteorological Reporter to the Government of India.

GOVERNMENT ORDERS.		Office to which proposition refers.	NATURE OF CHARGES.				PROPOSITION.				Grounds of Proposition.	ORDERS OF THE GOVERNMENT OF INDIA.				
No.	Date.		PRESENT SCALE.		PROPOSED SCALE.		PERMANENT.		TEMPORARY.			HOME DEPARTMENT.	FINANCIAL DEPARTMENT.	Orders.		
			No.		R a. p.	No.		R a. p.	Increase per month.	Decrease per month.					Increase per month.	Decrease per month.
			Bengal.													
Govt. of India, Rev. and Agri. Dept., No. 165—13-31 Met.	19th Oct. 1888 .		1	Meteorological Observer,	18 0 0	1	Meteorological Observer,	10 0 0	...	8 0 0						
Ditto ditto . . .	Ditto . . .		1	Meteorological Observer,	18 0 0	1	Meteorological Observer,	10 0 0	...	8 0 0						
Govt. of India, Rev. and Agri. Dept., No. 182—73-3.	21st Jan. 1898 .		1	Meteorological Observer,	23 0 0	1	Meteorological Observer,	28 0 0	5 0 0	...						
Govt. of India, Rev. and Agri. Dept., No. 165—13-31 Met.	19th Oct. 1888 .		1	Meteorological Observer,	18 0 0	1	Meteorological Observer,	10 0 0		8 0 0						
Ditto ditto . . .	Ditto . . .		1	Meteorological Observer,	23 0 0	1	Meteorological Observer,	28 0 0	5 0 0							
Govt. of India, Rev. and Agri. Dept., No. 891—8-6 Met.	25th April 1891		1	Meteorological Observer,	18 0 0	1	Meteorological Observer,	23 0 0	5 0 0	...						
Govt. of India, Rev. and Agri. Dept., No. 165—13-31 Met.	19th Oct. 1888		1	Meteorological Observer,	18 0 0	1	Meteorological Observer,	10 0 0	...	8 0 0						
Ditto ditto . . .	Ditto . . .		1	Meteorological Observer,	18 0 0	1	Meteorological Observer,	10 0 0		8 0 0						
Govt. of India, Rev. and Agri. Dept., No. 182—73-3.	21st Jan. 1898 .		1	Meteorological Observer,	18 0 0	1	Meteorological Observer,	23 0 0	5 0 0	...						
					172 0 0			152 0 0	20 0 0	40 0 0						
			Assam.													
Govt. of India, Rev. and Agri. Dept., No. 3055—79-2.	29th Dec. 1896 .		1	Meteorological Observer,	18 0 0	1	Meteorological Observer,	10 0 0	...	8 0 0						
Govt. of India, Rev. and Agri. Dept., No. 1104—17.	5th April 1893 .		1	Meteorological Observer,	18 0 0	1	Meteorological Observer,	10 0 0	...	8 0 0						
Ditto ditto . . .	Ditto . . .		1	Meteorological Observer,	18 0 0	1	Meteorological Observer,	10 0 0	...	8 0 0						
							1	Meteorological Observer,	10 0 0	10 0 0	...					
							1	Meteorological Observer,	10 0 0	10 0 0	...					
							1	Meteorological Observer,	10 0 0	10 0 0	...					
							1	Meteorological Observer,	10 0 0	10 0 0	...					
							1	Meteorological Observer,	10 0 0	10 0 0	...					
							1	Meteorological Observer,	10 0 0	10 0 0	...					
							1	Meteorological Observer,	10 0 0	10 0 0	...					
							1	Meteorological Observer,	10 0 0	10 0 0	...					
							1	Meteorological Observer,	10 0 0	10 0 0	...					
							1	Meteorological Observer,	10 0 0	10 0 0	...					
							1	Meteorological Observer,	10 0 0	10 0 0	...					
							1	Meteorological Observer,	10 0 0	10 0 0	...					
							1	Meteorological Observer,	10 0 0	10 0 0	...					
							1	Meteorological Observer,	10 0 0	10 0 0	...					
							1	Meteorological Observer,	10 0 0	10 0 0	...					
							1	Meteorological Observer,	10 0 0	10 0 0	...					
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							1	Meteorological Observer,	10 0 0	10 0 0	...					
							1	Meteorological Observer,	10 0 0	10 0 0	...					
							1	Meteorological Observer,	10 0 0	10 0 0	...					
							1	Meteorological Observer,	10 0 0	10 0 0	...					
							1	Meteorological Observer,	10 0 0	10 0 0	...					
							1	Meteorological Observer,	10 0 0	10 0 0	...					
							1	Meteorological Observer,	10 0 0	10 0 0	...					
							1	Meteorological Observer,	10 0 0	10 0 0	...					
							1	Meteorological Observer,	10 0 0	10 0 0	...					
							1	Meteorological Observer,	10 0 0	10 0 0	...					
							1	Meteorological Observer,	10 0 0	10 0 0	...			</		

		Meteorological	North-Western Provinces and Oudh.											
Govt. of India, Rev. and Agri. Dept., No. 165—13-31 Met.	19th Oct. 1888.		1	Meteorological Observer, Agra.	18 0 0	1	Meteorological Observer, Agra.	10 0 0	...	8 0 0				
Govt. of India, Rev. and Agri. Dept., No. 922—31.	28th Mar. 1895.		1	Meteorological Observer, Lucknow.	18 0 0	1	Meteorological Observer, Lucknow.	10 0 0	...	8 0 0				
Govt. of India, Rev. and Agri. Dept., No. 967—8-7.	13th May 1891.		1	Meteorological Observer, Ranikhet.	18 0 0	1	Meteorological Observer, Ranikhet.	23 0 0	5 0 0					
Govt. of India, Rev. and Agri. Dept., No. 922—31.	28th Mar. 1895.		1	Meteorological Observer, Roorkee.	22 0 0	1	Meteorological Observer, Roorkee.	27 0 0	5 0 0					
					76 0 0			70 0 0	10 0 0	16 0 0				
				Punjab.										
Govt. of India, Rev. and Agri. Dept., No. 967—8-7.	13th May 1891.		1	Meteorological Observer, Ludhiana.	18 0 0	1	Meteorological Observer, Ludhiana.	23 0 0	5 0 0					
Govt. of India, Rev. and Agri. Dept., No. 165—13-31 Met.	19th Oct. 1888.		1	Meteorological Observer, Mooltan.	18 0 0	1	Meteorological Observer, Mooltan.	10 0 0	...	8 0 0				
Govt. of India, Rev. and Agri. Dept., No. 967—8-7.	13th May 1891.		1	Meteorological Observer, Murree.	18 0 0	1	Meteorological Observer, Murree.	10 0 0	...	8 0 0				
Govt. of India, Rev. and Agri. Dept., No. 165—13-31 Met.	19th Oct. 1888.	1	Meteorological Observer, Peshawar.	18 0 0	1	Meteorological Observer, Peshawar.	23 0 0	5 0 0						
					1	Meteorological Observer, Chor Peak.	40 0 0	40 0 0						
			Central Provinces.				72 0 0	106 0 0	50 0 0	16 0 0				
Govt. of India, Rev. and Agri. Dept., No. 165—13-31 Met.	19th Oct. 1888.	1	Meteorological Observer, Hoshangabad.	18 0 0	1	Meteorological Observer, Hoshangabad.	10 0 0	...	8 0 0					
Ditto ditto . . . Ditto . . .		1	Meteorological Observer, Jubbulpore.	22 0 0	1	Meteorological Observer, Jubbulpore.	14 0 0	...	8 0 0					
Ditto ditto . . . Ditto . . .		1	Meteorological Observer, Khandwa.	18 0 0	1	Meteorological Observer, Khandwa.	23 0 0	5 0 0						
Govt. of India, Rev. and Agri. Dept., No. 922—31.	28th Mar. 1895.	1	Meteorological Observer, Nagpur.	25 0 0	1	Meteorological Observer, Nagpur.	25 0 0							
Govt. of India, Rev. and Agri. Dept., No. 165—13-31 Met.	19th Oct. 1888.	1	Extra Assistant Meteorological Observer, Nagpur.	10 0 0	1	Extra Assistant Meteorological Observer, Nagpur.	10 0 0							
Govt. of India, Rev. and Agri. Dept., No. 967—8-7.	13th May 1891.	1	Meteorological Observer, Pachmarhi.	18 0 0	1	Meteorological Observer, Pachmarhi.	23 0 0	5 0 0						
Govt. of India, Rev. and Agri. Dept., No. 165—13-31 Met.	19th Oct. 1888.	1	Meteorological Observer, Raipur.	18 0 0	1	Meteorological Observer, Raipur.	10 0 0	...	8 0 0					
Govt. of India, Rev. and Agri. Dept., No. 967—8-7.	13th May 1891.	1	Meteorological Observer, Saugor.	18 0 0	1	Meteorological Observer, Saugor.	10 0 0	...	8 0 0					
					1	Meteorological Observer, Central Provinces.	10 0 0	10 0 0						
			Central India and Rajputana.				147 0 0	135 0 0	20 0 0	32 0 0				
Govt. of India, Rev. and Agri. Dept., No. 165—13-31 Met.	19th Oct. 1888.	1	Meteorological Observer, Ajmere.	18 0 0	1	Meteorological Observer, Ajmere.	10 0 0	...	8 0 0					
Govt. of India, Rev. and Agri. Dept., No. 967—8-7.	13th May 1891.	1	Meteorological Observer, Mount Abu.	18 0 0	1	Meteorological Observer, Mount Abu.	23 0 0	5 0 0						
Govt. of India, Rev. and Agri. Dept., No. 165—13-31 Met.	19th Oct. 1888.	1	Meteorological Observer, Sutna.	18 0 0	1	Meteorological Observer, Sutna.	10 0 0	...	8 0 0					
				54 0 0			43 0 0	5 0 0	16 0 0					

GOVERNMENT ORDERS.		Office to which proposition refers.	NATURE OF CHARGES.						PROPOSITION.				Grounds of Proposition.	ORDERS OF THE GOVERNMENT OF INDIA.		
No.	Date.		PRESENT SCALE.			PROPOSED SCALE.			PERMANENT.		TEMPORARY.			HOME DEPARTMENT.	FINANCIAL DEPARTMENT.	Orders.
			No.		R a. p.	No.		R a. p.	Increase per month.	Decrease per month.	Increase per month.	Decrease per month.				
			<i>Bombay and Sind.</i>													
Govt. of India, Rev. and Agri. Dept., No. 165-13-31 Met.	19th Oct. 1888.	Observatories.	1	Meteorological Observer, Belgaum.	22 0 0	1	Meteorological Observer, Belgaum.	27 0 0	5 0 0							
Govt. of India, Rev. and Agri. Dept., No. 967-8-7.	13th May 1891.		1	Meteorological Observer, Deesa.	22 0 0	1	Meteorological Observer, Deesa.	27 0 0	5 0 0							
Govt. of India, Rev. and Agri. Dept., No. 165-13-31 Met.	19th Oct. 1888.		1	Meteorological Observer, Jacobabad.	18 0 0	1	Meteorological Observer, Jacobabad.	23 0 0	5 0 0							
Ditto ditto	Ditto		1	Meteorological Observer, Karwar.	23 0 0	1	Meteorological Observer, Karwar.	28 0 0	5 0 0							
Govt. of India, Rev. and Agri. Dept., No. 3244-63-2.	28th Nov. 1895		1	Meteorological Observer, Kurrachee.	23 0 0	1	Meteorological Observer, Kurrachee.	28 0 0	5 0 0							
Govt. of India, Rev. and Agri. Dept., No. 967-8-7.	13th May 1891		1	Meteorological Observer, Poona.	18 0 0	1	Meteorological Observer, Poona.	23 0 0	5 0 0							
Govt. of India, Rev. and Agri. Dept., No. 165-13-31 Met.	19th Oct. 1888.		1	Meteorological Observer, Ratnagiri.	23 0 0	1	Meteorological Observer, Ratnagiri.	15 0 0	...	8 0 0						
Ditto ditto	Ditto		1	Meteorological Observer, Sholapur.	18 0 0	1	Meteorological Observer, Sholapur.	23 0 0	5 0 0							
						167 0 0			194 0 0	35 0 0	8 0 0					
				<i>Madras and Coorg.</i>												
Govt. of India, Rev. and Agri. Dept., No. 165-13-31 Met.	19th Oct. 1888.	Observatories.	1	Meteorological Observer, Bellary.	18 0 0	1	Meteorological Observer, Bellary.	23 0 0	5 0 0							
Ditto ditto	Ditto		1	Meteorological Observer, Cochin.	23 0 0	1	Meteorological Observer, Cochin.	15 0 0	...	8 0 0						
Govt. of India, Rev. and Agri. Dept., No. 1104-17.	5th April 1893 .		1	Meteorological Observer, Cocanada.	23 0 0	1	Meteorological Observer, Cocanada.	28 0 0	5 0 0							
Govt. of India, Rev. and Agri. Dept., No. 165-13-31 Met.	19th Oct. 1888.		1	Meteorological Observer, Mercara.	18 0 0	1	Meteorological Observer, Mercara.	10 0 0	...	8 0 0						
Ditto ditto	Ditto		1	Meteorological Observer, Salem.	18 0 0	1	Meteorological Observer, Salem.	23 0 0	5 0 0							
Ditto ditto	Ditto		1	Meteorological Observer, Trichinopoly.	18 0 0	1	Meteorological Observer, Trichinopoly.	10 0 0	...	8 0 0						
Govt. of India, Rev. and Agri. Dept., No. 967-8-7.	13th May 1891.		1	Meteorological Observer, Wellington.	18 0 0	1	Meteorological Observer, Wellington.	23 0 0	5 0 0							
						136 0 0			132 0 0	20 0 0	24 0 0					
			<i>Burma.</i>													
Govt. of India, Rev. and Agri. Dept., No. 165-13-31 Met.	19th Oct. 1888.	Meteorological	1	Meteorological Observer, Akyab.	23 0 0	1	Meteorological Observer, Akyab.	28 0 0	5 0 0							
Ditto ditto	Ditto		1	Meteorological Observer, Diamond Island.	25 0 0	1	Meteorological Observer, Diamond Island.	30 0 0	5 0 0							
Govt. of India, Rev. and Agri. Dept., No. 922-31.	28th March 1895		1	Meteorological Observer, Rangoon.	22 0 0	1	Meteorological Observer, Rangoon.	27 0 0	5 0 0							
						70 0 0			85 0 0	15 0 0						
			<i>Bay Islands.</i>													
Govt. of India, Rev. and Agri. Dept., No. 165-13-31 Met.	19th Oct. 1888.	Meteorological	1	Meteorological Observer, Port Blair.	18 0 0	1	Meteorological Observer, Port Blair.	23 0 0	5 0 0							
				<i>Extra India.</i>												
Govt. of India, Rev. and Agri. Dept., No. 165-13-31 Met.	19th Oct. 1888.		1	Meteorological Observer, Quetta.	18 0 0	1	Meteorological Observer, Quetta.	23 0 0	5 0 0							
Ditto ditto	Ditto		1	Electrician at Jeypore . . .	30 0 0	1	Electrician at Jeypore . . .	30 0 0								
					48 0 0			53 0 0	5 0 0							
				TOTAL	1,014 0 0			1,073 0 0	235 0 0	176 0 0						

The entries in column "Present Scale" have been checked and found to be correct with the following exceptions :-
 (1) The pay of the Assistant Observer at Nagpur should be entered—Article 57, Civil Account Code.
 (2) Personal allowance of Rs15 of Babu Joti Lal Dey should be reduced by Rs3 or by Rs6 (should his second annual increment be given from December 1898).

T. C. MITRA,
 Assistant Comptroller, India Treasuries.

CALCUTTA;
 The 22nd December 1898.

JOHN ELIOT,
 Meteorological Reporter to the Government of India.

GOVERNMENT OF INDIA.

DEPARTMENT OF REVENUE AND AGRICULTURE.

METEOROLOGY.

To

THE RIGHT HONOURABLE LORD GEORGE F. HAMILTON,
Her Majesty's Secretary of State for India.

Calcutta, the 23rd February 1899.

MY LORD,

WE have the honour to submit, for Your Lordship's approval, a scheme for strengthening the staff of the Meteorological Department. The chief features of the scheme are described in paragraphs 17—29 of the Meteorological Reporter's letter of the 28th of September last, a copy of which is enclosed for Your Lordship's information. Briefly stated the main object is to relieve the Meteorological Reporter and his Assistant, Mr. Dallas, of that portion of their present duties which can be equally well performed by officers of lower standing and attainments, and to utilize their extensive knowledge and experience of Indian meteorology before their retirement from active service to the best possible advantage.

2. It is therefore proposed to appoint a First and Second Assistant, on salaries of R400—20—500 and R150—10—250 a month respectively, who will carry on the work connected with weather reports, warnings and forecasts and the routine duties of the Simla Office, and to bring the post of Personal Assistant to the Reporter on R100—150 under reduction. The Meteorological Reporter, Mr. Eliot, will devote himself to certain investigations which are at present in hand, to rewriting the Hand-book of Cyclonic Storms in the Bay of Bengal, to deducing from the observations at all Indian stations for the 25 years from 1875—1899, "the most probable normal annual, monthly and daily values of the elements of observations," and subsequently to preparing an atlas and scientific manual of Indian meteorology. Mr. Dallas will be employed on the tabulation and discussion of the data of the Bay of Bengal and Arabian Sea and the preparation of pilot charts. To enable the two officers concerned to carry out these investigations, the Calcutta Office will be temporarily reduced and the Simla Office to some degree extended. It is also proposed to employ an Inspector of Observatories on R50—75 a month for one year only in the first instance, and to convert the appointment into a permanent one should the results prove satisfactory.

3. In accepting the scheme we agree with the Meteorological Reporter that it will prepare the way for the ultimate reorganization of the Department on

Mr. Eliot's retirement, and obviate the necessity of hereafter obtaining from Europe the services of a highly paid Assistant Meteorological Reporter in the room of the present incumbent (Mr. Dallas). We agree with Mr. Eliot that for the work connected with the collation and preparation of the daily weather report, which is largely of a routine character, subordinate officers recruited in India will suffice. The scheme makes provision for two such officers. For the second officer the Meteorological Reporter recommended a salary of R250—20—350 a month, but we have fixed it at R150—10—R250.

4. We do not propose to discuss at present the important question of finding a successor to Mr. Eliot on his retirement, or of the arrangements which may be necessary in order to secure an officer with the scientific attainments and standing requisite for the discharge of the enlarged duties which have gradually devolved upon the present Meteorological Reporter. With our Despatch No. 14, dated 2nd February 1899, we forwarded the recommendations of a Departmental Committee as to the future constitution of our Indian Observatories. One of these recommendations is that the head of the Meteorological Department and of the Indian Observatories should invariably be an officer of the highest scientific attainments. In order to fulfil this condition it would probably be necessary that he should be specially selected in England by Your Lordship for the office, and should be a man of known reputation.

5. The minor portions of the scheme discussed in paragraphs 1 to 16 and 30 to 36 of Mr. Eliot's letter relate to certain additions to the number of observatories and to modifications in the status of those already in existence, and to revision of the clerical establishment of the meteorological office. Apart from their financial relation to the general scheme they call for no comment. The financial effect of the proposals is shown in the marginal abstract of the proposition statement, a copy of which is enclosed. In conclusion we would ask Your Lordship's sanction to the scheme as a whole, including the appointment of a First Assistant to the Meteorological Reporter on R400—20—500.

	R.	a.	p.
<i>Meteorological Office, Calcutta—</i>		per mensem.	
Decrease (temporary) . . .	—	323	12 0
<i>Meteorological Office, Simla—</i>			
Increase (permanent) . . .	+	790	0 0
Decrease (permanent) . . .	—	137	8 0
Increase (temporary) . . .	+	260	0 0
<i>Meteorological Observatories—</i>			
Increase (permanent) . . .	+	235	0 0
Decrease (permanent) . . .	—	173	0 0
<i>Net Increase (permanent)</i> . . .	+	711	8 0
<i>Net Decrease (temporary)</i> . . .	—	63	12 0

We have the honour to be,

MY LORD,

Your Lordship's most obedient and humble Servants,

CURZON OF KEDLESTON.

W. S. A. LOCKHART.

J. WESTLAND.

M. D. CHALMERS.

E. H. H. COLLEN.

A. C. TREVOR.

C. M. RIVAZ.

No. 568—57-4.

Copy forwarded to the Finance Department for information.

By order,

E. MACONCHIE,

Under Secretary to the Government of India.

List of Enclosures.

1. Letter from the Meteorological Reporter to the Government of India, No. 553 S., dated 28th September 1898.
2. Proposition Statement.



FILE NO. 57 OF 1899.

No.

SERIAL NO. 4.

1899.

Department of Revenue & Agriculture.

METEOROLOGY.

No. 16, DATED CALCUTTA, THE 23RD FEBRUARY 1899.

(COPY.)

*(Letter to Her Majesty's Secretary of State
for India.)*

SUBJECT.

SCHEME for strengthening the staff of the
Meteorological Department.

PROCEEDINGS

OF

THE DEPARTMENT OF REVENUE AND AGRICULTURE

FOR

MAY, 1899.

METEOROLOGY.

FUNDAMENTAL MAGNETIC SURVEY OF INDIA. DEPUTATION OF CAPTAIN
FRASER TO ENGLAND.

[Proceedings—No. 1.]

No. 1.]

Telegram, dated the 2nd May 1899.

File No. 16 of
1899.
Serial No. 3.

From—London,

To—Simla.

From—Secretary of State,

To—Viceroy.

YOUR Revenue Despatch, 30th March last. Deputation, Fraser. Proposed arrangement sanctioned. Should bring home leave and pay certificate.

No. 1392—16-3, dated Simla, the 3rd May 1899.

Endorsed by the DEPARTMENT OF REVENUE AND AGRICULTURE.

COPY forwarded to the Finance Department for information in continuation of endorsement No. 1067—16-2, dated the 4th April 1899.

No. 1393—16-3, dated Simla, the 3rd May 1899.

Endorsed by the DEPARTMENT OF REVENUE AND AGRICULTURE.

COPY, with copy of the despatch to which it is a reply, forwarded to the Surveyor General of India for information and guidance with reference to his letter No. 677 S., dated 25th February 1899.

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, MAY, 1899.

Re-organization of the Meteorological Department.

[Pros. No. 2]

RE-ORGANIZATION OF THE METEOROLOGICAL DEPARTMENT.

[Proceedings—Nos. 2 and 3.]

No. 2.] No. 74 (Rev)., dated India Office, London, the 20th April 1899.

From—Her Majesty's Secretary of State for India,

To—The Government of India.

File No. 34 of
1899.
Serial No. 1.

A Pros.,
April 1899,
Nos. 1 to 4.

I HAVE considered in Council your Excellency's letter No. 16 (R. & A.), dated 23rd February 1899, submitting proposals connected with the organization of your Meteorological Department.

2. Leaving for the time the question of the arrangements to be made after the retirement of Mr. Eliot, you propose that, by the changes recommended, he and his Assistant Mr. Dallas should be set free for carrying out the more important work devolving on them, as detailed in the second paragraph of your letter.

3. The scheme, besides some minor changes, includes the appointment of a First Assistant on R400—20—500, and of a Second Assistant on R150—10—250 a month, the present post of Personal Assistant being abolished. The net effect of the proposals is a permanent increase of R711-8, with a temporary decrease of R63-12.

4. I accord my sanction to these arrangements.

I have, etc.,

GEORGE HAMILTON.

FROM

THE HON'BLE MR. M. FINUCANE, C.S.I.,
Offg. Secretary to the Government of India,

To

THE METEOROLOGICAL REPORTER TO THE
GOVERNMENT OF INDIA AND DIRECTOR
GENERAL OF INDIAN OBSERVATORIES.

Dept of Rev & Agri.
Meteorology.

Simla, the 18th May 1899.

SIR,

With reference to the correspondence ending with your letter No. 22-S., dated 7th January 1899, I am directed to forward, for your information and guidance, a copy of the despatches noted in the margin regarding the re-organisation of the Meteorological Department, and to say that the Secretary of State's sanction to the scheme will take effect from the date of its receipt by the Government of India, that is, 8th May 1899.

Despatch to Secretary of State, No. 16, dated 23rd February 1899.
Despatch from Secretary of State, No. 74 (Revenue), dated 20th April 1899.

2. I am to inform you that the revised proposals made in paragraphs 3 and 4 of your letter No. 22-S., dated the 7th January 1899, regarding the Jubbulpore, Khandwa, Poona, Cocanada and Jeypore observatories have the approval of the Government of India. The proposal made in paragraph 8 of the same letter to give some of the temporary posts referred to in paragraph 35 of your letter No. 553-S., dated the 28th September 1899, to clerks in your Simla office is covered by Article 410 of the Civil Service Regulations, which provides that, if an officer in a permanent establishment is detached on temporary duty, on the understanding that when the temporary duty ceases he will return to the permanent establishment, he counts his detached service.

3. I am to add that the Government of India await your definite proposals regarding the establishment of an observatory on the Chor promised in paragraph 9 of your letter of the 7th January 1899.

I have the honour to be,

SIR,

Your most obedient servant,

M. FINUCANE.

Offg. Secy. to the Govt. of India.

No. 1597—34-2.

Copy, with a copy of letter No. 22-S., dated 7th January 1899, from the Meteorological Reporter to the Government of India, and of the despatch from the Secretary of State, No. 74 (Revenue), dated 20th April 1899, forwarded to the Finance Department for information, in continuation of endorsement No. 568—57-4, dated 23rd February 1899.

By order.

E. MACONOCHIE,

Under-Secy. to the Govt. of India.

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, MAY, 1899.

Appointment of Mr. Bion to be First Assistant to Meteorological Reporter, etc. [Pros. No. 5

APPOINTMENT OF MR. W. A. BION, ASTRONOMER, JUGGA ROW OBSERVATORY,
TO THE POST OF FIRST ASSISTANT TO THE METEOROLOGICAL REPORTER
TO THE GOVERNMENT OF INDIA AND DIRECTOR GENERAL OF INDIAN
OBSERVATORIES.

[Proceedings—Nos. 4 and 5.]

No. 4.]

No. 393 S., dated Simla, the 19th May 1899.

File No. 37 of
1899.
Serial No. 1.

*From—J. ELOIT, Esq., Meteorological Reporter to the Government of India and
Director General of Indian Observatories,*

To—The Secretary to the Government of India.

A, Pros.,
April 1899,
Nos. 1 to 4.
F. 57 of
1898.
A Pros.,
May 1899,
Nos. 2 and
3.
F. 34.
A Pros.,
May 1894,
Nos. 11 to
20.
A Pros.,
Sept. 1895,
Nos. 3 to 37.

I HAVE the honour in continuation of the correspondence commencing with my No. 553S. of the 28th September 1898 containing certain proposals for the reorganization of the Department and ending with the despatch of the Secretary of State sanctioning these proposals, to ask that the Government will be pleased to sanction the appointment of Mr. W. A. Bion, Astronomer, Jugga Row Observatory, to the post of First Assistant, created by the sanction of the Secretary of State. I may first point out that I recommended Mr. Bion for the post in my letter of 28th September 1898, *vide* paragraph 28, and stated there very briefly his qualifications for the post. Mr. Bion is a London University man, and was for some years Assistant Secretary to the Asiatic Society. He acted for Mr. Dallas when that officer was on furlough from 8th March 1894 to 16th March 1895, and during the greater part of that time prepared the Daily Weather Report and carried on successfully the duties of warning the West or Bombay Coast. When the Government took over the Vizagapatam (Jugga Row) Observatory, Mr. Bion was appointed Astronomer, and has during the past four years been Director of an important observatory under Government control, and has greatly improved it and placed it on a thoroughly satisfactory footing. He has devoted much of his time during this period to meteorology, and is fully competent to take up all the duties of the new post at once, and without any preliminary training.

2. In addition to this it is possible, if not probable, that in virtue of the recent decision in the Judge's Court at Vizagapatam, the Government may have to hand over the observatory to its original owner as represented by Mr. Jugga Row. Mr. Bion has hence some claim for further employment under Government, if a suitable post can be found for him, and in any case if on appeal the present decision be reversed, it would be advisable later to appoint a native to the post of Astronomer at Vizagapatam and thus reduce the cost of direction and effect savings to be utilized in the purchase of large astronomical instruments required for the improvement of the observatory.

3. Mr. Bion, according to the records of my office, was born on the 20th March 1858 and is hence now 41 years of age. Rule 63 of the Civil Service Regulations lays down that a person whose age exceeds 25 years may not ordinarily be admitted into the service of the State. I have the honour to ask that this rule may be set aside in the present case, under the special circumstances of Mr. Bion's previous services and also in consideration of the fact that there is no one in India except Mr. Bion who could be appointed to the post, that has any practical acquaintance with the duties of the proposed post. It would almost certainly take from 6 to 12 months to give the necessary preliminary training to any other officer appointed, and it is just possible the selected officer may not turn out satisfactorily, whereas in the case of Mr. Bion we have one who has already qualified for the post under Government service in the Meteorological Department, and who has proved himself a satisfactory and zealous officer in every respect.

4. Under these circumstances I have the honour to suggest that the Government of India will sanction the appointment of Mr. Bion at as early a date as possible in order to give me the assistance necessary to carry out the sanctioned changes during the present year (*i.e.*, before 31st December).

No. 5.]

No. 1719—37-2, dated Simla, the 27th May 1899.

Serial No 2.

From—E. MACONOCHE, Esq., Under-Secretary to the Government of India,

*To—The Meteorological Reporter to the Government of India and Director General
of Indian Observatories.*

IN reply to your letter No. 393S., dated 19th May 1899, I am directed to say that the Governor General in Council is pleased to sanction the appoint-

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, MAY, 1899.

Pros. No. 5] Appointment of Mr. Bion to be First Assistant to Meteorological Reporter, etc.

ment of Mr. W. A. Bion, Astronomer, Jugga Row Observatory at Vizagapatam, to the post of First Assistant to the Meteorological Reporter to the Government of India and Director General of Indian Observatories on a pay of R400 rising to R500 per mensem by annual increments of R20.

No. 1720—37-2.

COPY of correspondence forwarded to the Home Department for information.

No. 1721—37-2.

COPY forwarded to the Comptroller, India Treasuries, for information.

PROCEEDINGS
OF
THE DEPARTMENT OF REVENUE AND AGRICULTURE
FOR
JUNE, 1899.
METEOROLOGY.

IMPROVEMENT IN THE SYSTEM OF FLOOD AND STORM WARNINGS.

[Proceedings—Nos. 1 to 6.]

No. 1.]

No. 749 R.C., dated Simla, the 26th April 1899.

File No. 10 of
1899.

Office Memo. from— C. J. COLE, Esq., Under-Secretary to the Government of India, P. W. DEPT., Serial No. 5.

To—The Secretary to the Government of India.

A Pros.,
Nov. 1898,
Nos. 8 to 5.

WITH reference to Revenue and Agricultural Department, Circular No. 26—35-3, dated the 9th November 1898, the undersigned is directed to forward copies of the marginally-noted

No. 913, dated 10th April 1899, from Engineer-in-Chief, Hurdwar-Dehra Railway, Dehra Dun.

No. 1009, dated 10th April 1899, from Engineer-in-Chief, Godavari Bridge, Rajahmundry.

Superintendent of Works, Northern Section, Eastern Bengal State Railway, Kaunia, with the storm and flood warnings referred to.

communications, which have been received from the Engineers-in-Chief of the Hurdwar-Dehra Railway and the Godavari Bridge, and to request the favour of arrangements being made specially to furnish the officers in question, and also the

No. 913, dated the 10th April 1899.

From—The Engineer-in-Chief, Hurdwar-Dehra Railway,

To—The Director of Railway Construction.

WITH reference to Government of India, Public Works Department, Circular No. 1 Railway of 1899 (for general distribution), relating to the improvement in the present system of warnings for storms and floods in India, I have the honour to request the favour of being supplied, during the current year from 1st May, with advices as to anticipated storms and floods in India.

No. 1009, dated the 10th April 1899.

From—The Engineer-in-Chief, Godavari Bridge,

To—The Director of Railway Construction.

WITH reference to Government of India, Public Works Department, Circular No. 1 Railway, dated 16th March 1899, I have the honour to request that you will be good enough to arrange that telegraphic warnings of heavy rainfall affecting the Central Provinces and Hyderabad may be issued to me.

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, JUNE, 1899.

Pros. No. 4] Improvement in the system of flood and storm warnings.

No. 2.] No. 1187 W., dated the 3rd May 1899.

Serial No. 6.

From—The Secretary to the Government of Madras, P. W. Dept.,
To—The Secretary to the Government of India.

B Pros.,
March 1899,
Nos. 5 to 7. In continuation of my letter No. 552 W., dated 22nd February 1899, and the Proceedings of Government which accompanied it, I am directed to request that information as to flood warnings may, in future, be addressed to the Agent, South Indian Railway at Trichinopoly, instead of to the Executive Engineer of that Railway at Vellore. The Agent will transmit the information to officers concerned.

No. 1246—10-6, dated Simla, the 12th May 1899.

Endorsed by the DEPARTMENT OF REVENUE AND AGRICULTURE.

COPY forwarded to the Meteorological Reporter to the Government of India for information and guidance, in continuation of endorsement No. 935—10-2, dated 16th March 1899.

No. 3.] No. 825 R.C., dated Simla, the 6th May 1899.

Serial No. 7.

Endorsed by the PUBLIC WORKS DEPARTMENT.

THE under-mentioned paper is forwarded to the Revenue and Agricultural Department, in continuation of Public Works Department office memorandum, No. 749 R. C., dated 26th April 1899, with the request that the Manager, Oudh and Rohilkhand Railway, may in future be furnished with warnings of such storms as would, in the opinion of the Meteorological Reporter, be likely to seriously affect the watershed traversed by the Oudh and Rohilkhand Railway.

No. 80 P.W., dated the 22nd April 1899.

From—The Manager, Oudh and Rohilkhand Railway,
To—The Secretary to the Government of India, PUBLIC WORKS DEPARTMENT.

WITH reference to your Circular No. 1, dated the 16th March 1899, in regard to the improvement of the present system of warnings of storms and floods in India, I have the honour to state that storm warnings have not hitherto been received on the Oudh and Rohilkhand Railway; I would suggest, however, that they be sent in future and a register of the same will then be kept as requested.

No. 1729—10-5 & 7, dated Simla, the 29th May 1899.

Endorsed by the DEPARTMENT OF REVENUE AND AGRICULTURE.

COPY of Serial Nos. 5 and 7 forwarded to the Meteorological Reporter to the Government of India and Director General of Indian Observatories for information, in continuation of endorsement No. 1246—10-6, dated 12th May 1899.

No. 4.] No. 910 R.C., dated Simla, the 23rd May 1899.

Serial No. 8

Endorsed by the PUBLIC WORKS DEPARTMENT.

THE following, with copy of endorsements to Manager, Eastern Bengal State Railway, and Engineers-in-Chief, Hurdwar-Dehra Railway and Godavari Bridge Works, is forwarded to the Department of Revenue and Agriculture for information, in continuation of Public Works Department Memorandum No. 825 R.C., dated 6th May 1899.

No. 907 R.C., dated the 23rd May 1899.

From—The Director of Railway Construction,
To—The Manager, Oudh and Rohilkhand Railway.

WITH reference to your letter No. 80 P. W., dated the 22nd April 1899, requesting to be furnished in future with the storm warnings referred to in Department of Revenue and

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, JUNE, 1899.

Improvement in the system of flood and storm warnings.

[Pros. No. 5]

A Pros.,
Nov. 1898,
Nos. 3 to 5.
B Pros.,
July 1889,
No. 22.

Agriculture Circular No. 26—35-3, dated the 9th November 1898, forwarded to your address under cover of Public Works Department Circular No. 1R., dated the 16th March 1899, I have the honour to point out that your application should have been prepared and submitted in accordance with the instructions on the subject conveyed in Public Works Department, Circular No. 643 R.C., dated 9th July 1889.

2. I have accordingly to request that you will submit a revised application direct to the Meteorological Reporter to the Government of India, Simla, prepared in accordance with the circular quoted in paragraph i above, a copy of which is herewith attached for ready reference.

No. 908 R.C., dated the 23rd May 1899.

Copy, with copy of Circular referred to, forwarded to the Manager, Eastern Bengal State Railway, for information and guidance, in continuation of this office endorsement No. 751 R.C., dated 26th April 1899.

No. 909 R.C., dated the 23rd May 1899.

Copy, with copy of Circular referred to, forwarded to the Engineer-in-Chief, ^{Hardwar-}
^{Godavari}
Dehra Railway Bridge Works, for information and guidance, in continuation of this office endorsement No. 750 R.C., dated 26th April 1899.

No. 1820—10-8, dated Simla, the 1st June 1899.

Endorsed by the DEPARTMENT OF REVENUE AND AGRICULTURE.

Copy forwarded to the Meteorological Reporter to the Government of India and Director General of Indian Observatories for information, in continuation of endorsement No. 1729—10-7, dated 29th May 1899.

No. 5.]

No. 426 S., dated Simla, the 31st May 1899.

Serial No. 9.

*From—J. ELIOT, Esq., Meteorological Reporter to the Government of India and
Director General of Indian Observatories,*

To—The Secretary to the Government of India.

I HAVE the honour to acknowledge the receipt of your No. 1729—10-5 and 7, dated the 29th May 1899, instructing me to arrange for the issue of storm flood warnings to certain officers in the Public Works Department. I have made arrangements for the inclusion of the officers in the list of those to whom warnings are sent.

2. I have, however, the honour to point out that these requests are now frequently sent in a manner not in accordance with the instructions in the Circular No. 643 R.C., dated 9th July 1889, issued by the Public Works Department. It is there distinctly laid down that "all requests should accompany full information as to the area on which, during any particular season of the year, exceptional rainfall would affect their works and a sketch map showing the catchment area, the rainfall over which would seriously affect the work. The officer requiring the warnings should also state the period of time during which he would wish to have warnings sent him." A reference to the enclosures accompanying your letter will, I think, at once show that these instructions have not been complied with.

3. The Engineer-in-Chief, Hurdwar-Dehra Railway, for example, asks for advices as to anticipated storms and floods in India. It is impossible to comply with such vague and extensive requests, unless I be granted a considerable increase of my telegraphic grant, and I have the honour to ask if I am to comply with the request in the form in which you have transmitted it to me or to limit our warnings to this officer to anticipated storms and floods likely to affect the Hurdwar-Dehra Railway.

4. Also the name of the station to which the warning telegrams are to be sent in the cases of the Engineer-in-Chief, Hurdwar-Dehra Railway, and the Manager, Oudh and Rohilkhand Railway, have not been communicated.

5. I have the honour to suggest that you should point out to the Public Works Department; it would save my small office time and trouble if that Department would forward all such requests in accordance with the Circular and in a complete form so that we can take the necessary action without further enquiry.

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, JUNE, 1899.

Pros. No. 6] Improvement in the system of flood and storm warnings.

No. 643 R. C., dated Simla, the 9th July 1889.

From—MAJOR M. C. BRACKENBURY, R.E., *Under-Secretary to the Govt. of India,*
PUBLIC WORKS DEPARTMENT,

To—*The Joint Secretaries to the Governments of Madras and Bombay (Railway Branch), Public Works Department, and the Secretaries to the Governments of Bengal, the North-Western Provinces and Oudh and the Punjab, Public Works Department.*

To—*The Chief Commissioners of the Central Provinces, Burma, Assam and Coorg.*

To—*The Residents at Hyderabad and in Mysore.*

To—*The Agents to the Governor General for Rajputana, Central India, and Baluchistan.*

To—*The Director General of Railways.*

To—*The Consulting Engineers to the Government of India for Railways, Calcutta, Lucknow, and Central Division.*

I AM directed to request that you will inform officers of the Public Works Department who may be employed at any time under your orders on important works situated on, or connected with, important waterways or drainage areas, that should they desire to receive warnings of any unusual rainfall which is likely to cause extraordinary floods and thereby cause damage or delay the progress of the works under them, they must inform the Meteorological Department of the Government of India at Simla that they wish for such warnings and supply that Department with full information as to the area on which, during any particular season of the year, exceptional rainfall would affect their works.

2. The officer in charge of such a work should apply direct to the Meteorological Reporter to the Government of India, Simla, and should send with his application a sketch map showing the catchment area, the rainfall over which would seriously affect the work, and state the period of time during which he would wish to have warnings sent him.

No. 6.] No. 1860—10-10, dated Simla, the 7th June 1899.

Serial No. 10.

From—E. MACONCHIE, Esq., *Under-Secretary to the Government of India,*

To—*The Meteorological Reporter to the Government of India and Director General of Indian Observatories.*

IN reply to your letter No. 426 S., dated 31st May 1899, I am directed to refer you to my endorsement No. 1820—10-8, dated 1st June 1899, with which was forwarded a copy of a letter from the Director of Railway Construction, to the Manager, Oudh and Rohilkhand Railway, No. 907 R. C., dated 23rd May 1899, containing instructions regarding the supply of storm warnings to certain officers of the Public Works Department.

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, JUNE, 1899.

Inspection of Extra Indian Observatories by officers of the Meteo. Dept. [Pros. No. 8

INSPECTION OF EXTRA INDIAN OBSERVATORIES BY OFFICERS OF THE METEOROLOGICAL DEPARTMENT.

[Proceedings—Nos. 7 and 8.]

No. 7.]

No. 155 S., dated Simla, the 10th February 1899.

File No. 12 of
1899.
Serial No. 1.

From—J. ELIOT, Esq., Meteorological Reporter to the Government of India,
To—The Secretary to the Government of India.

I HAVE the honour to ask that the Government of India will be pleased to furnish me with definite orders regarding the inspection of Meteorological observatories maintained by the Government outside of India and in territories not directly subject to it. Amongst those are—

Zanzibar.
Seychelles.
Kabul.
Kashgar.
Katmandu.
Teheran.
Ispahan.

Bushire.
Meshed.
Jask.
Muscat.
Baghdad.
Resht.

The first two observatories are now utilized in order to give special information of the progress of the south-west monsoon, and Teheran, Ispahan and Bushire for early information of the formation of cold weather storms in Persia and their approach to India. It is most desirable, considering the important practical use that is made of the observations taken at these observatories, that they should be occasionally inspected either by myself or other officer of the Department whom I can arrange to send.

I have hence the honour to ask that the Government of India will be pleased to give a general order authorizing the inspection of any observatories outside of India maintained by the Government of India or working in direct connection and co-ordination with the India Meteorological Department by officers of that Department on my authority, and will also rule whether the inspecting officers for such journeys shall, if there be any precedent, draw travelling allowance at Indian rates or at special rates to be fixed later in consultation with the Financial Department.

No. 8.]

No. 1845—12-2, dated Simla, the 3rd June 1899.

Serial No. 2.

From—E. MACONOCHE, Esq., Under-Secretary to the Government of India,
To—The Meteorological Reporter to the Government of India
and Director General of Indian Observatories.

I AM directed to acknowledge the receipt of your letter No. 155 S., dated 10th February 1899, in which you ask for a general order authorising the inspection by officers of the Meteorological Department of any observatories outside India maintained by the Government of India or working in direct connection and co-ordination with the India Meteorological Department, and for a ruling regarding the travelling allowances to be drawn by the inspecting officers.

2. In reply I am to inform you that the Government of India consider that there are objections to granting a general authority, and I am to request that when you contemplate the inspection of any extra Indian observatories, separate proposals in each case may be submitted for the sanction of the Government of India showing the probable duration of, and the anticipated cost of the tour.

No. 1846—12-2.

COPY forwarded to the Finance Department for information.

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, JUNE, 1899.

Deputation of Capt. Frazer to Eng. in con. with Magnetic Survey of India. [Pros. No. 9]

DEPUTATION OF CAPTAIN FRASER TO ENGLAND IN CONNECTION WITH THE
MAGNETIC SURVEY OF INDIA AND EXTENSION OF HIS LEAVE IF NECES-
SARY.

INSTRUMENTS REQUIRED FOR THE MAGNETIC SURVEY OF INDIA.

[Proceedings—Nos. 9 to 14.]

No. 9.]

File No. 16 of
1899.

Serial No. 4.

From—MAJOR-GENERAL C. STRAHAN, R.E., Surveyor-General of India,

To—The Secretary to the Government of India, Department of Revenue and
Agriculture.

I have the honour to enclose a copy of a letter No. 1598, dated 8th May 1899, from Lieutenant-Colonel Gore, R.E., Superintendent, Trigonometrical Surveys, on the subject of Captain Fraser's deputation to England to make arrangements for the magnetic survey of India.

2. Quite lately when inspecting the Trigonometrical Office at Dehra, I consulted with the Superintendent on this subject and quite agreed with him in his views ; I now therefore forward his letter for favourable consideration. I may add that since my visit to Dehra I have received the sanction of the Secretary of State, forwarded under your endorsement No. 1393—16—3, dated 3rd May 1899 ; but that, owing to the miscarriage of a letter, it had not reached Colonel Gore when he wrote his letter No. 1598.

Pro. A., May 1899,
No. 1.

3. With regard to the purchase of six 6-inch theodolites fitted with micro-meters, I would further explain that we have none or at all events perhaps only one or two such instruments in stock, and that it would be impossible for the Mathematical Instrument Office to convert any now in our possession into the required form. A portable instrument and yet one of considerable precision is required to ascertain the astronomical azimuth with sufficient accuracy ; the ordinary small theodolites, to the indenting for which the present prohibitive order more particularly applies, are not accurate enough. I would therefore strongly recommend that Captain Fraser be authorised to order six theodolites as described by Colonel Gore, as well as the six sets of magnetic instruments which after consultation shall be considered most suitable.

4. With reference to paragraph 5 of Colonel Gore's letter, I would further explain that, although it is very probable that the instruments may not be ready to allow of work being commenced so soon as 1st October, yet it is almost certain that they would be ready some time during the first portion of the cold weather. There would be no object in Captain Fraser's returning long before the instruments can be sent out, as by October the programme of field operations must have been made out and the different works allotted to the different officers to be employed.

5. The necessary permission asked for in paragraph 6 should be officially obtained.

No. 1598, dated the 8th May 1899.

From—The Superintendent, Trigonometrical Surveys,

To—The Surveyor-General of India.

With reference to your endorsement No. 1125-S. of 7th April 1899, forwarding a copy of a despatch to Her Majesty's Secretary of State for India on the subject of the deputation of Captain Fraser to England to make arrangements for the magnetic survey, I have the honour to put the following before you :

2. Although no orders have yet been received for Captain Fraser to proceed to England, it will save much valuable time if certain points can be settled in advance.

3. It will be necessary to authorise Captain Fraser to arrange with the India Office for the purchase of the requisite magnetic instruments. Six sets will be required, and they should be of the latest and best pattern. The old Kew pattern Unifilar instruments are most inconvenient and difficult to use in the field, especially owing to the fact that the observing telescope is fixed horizontally,

and that therefore any referring mark, the azimuth of which has been determined must lie exactly in the horizontal plane of the telescope, a condition most difficult to fulfil. The method of determining the azimuth by transits observed on the small reflecting mirror is of little use in the country as accurate local time cannot be obtained as in England from chronometers set to Greenwich time, but must be found by direct observation, and so it is simpler to observe the azimuth independently. Consequently there is no point about fixing the telescope horizontally.

A second very weak point is the design by which the magnets are slung in a brass sleeve. As the dip changes very considerably, it becomes necessary to rebalance the magnet at each place of observation by sliding it through the suspending sleeve. This is a most difficult operation to perform exactly without revolving the magnet in the sleeve and so spoiling the horizontality of the scale. The American method of suspension avoids this difficulty.

I mention these technical points in a letter where perhaps they may seem out of place, in order to show the necessity of Captain Fraser being authorised to consult with the India Office and the makers as to the instruments which are to be ordered.

4. As azimuths have to be determined with considerable accuracy at each spot when the magnetic elements are determined, it will be necessary for each observer to carry a good theodolite in addition to the magnetic instruments proper.

For this purpose the most suitable instruments would be good 6-inch theodolites.

I have enquired from the Mathematical Instrument Office and I find that they cannot supply these without unduly depleting their stock of better class of instruments, and that they are prohibited by a recent order from indenting for new ones. I would therefore propose that Captain Fraser at the same time, as he arranges for the ordering of the magnetic instruments, be authorised to obtain six 6-inch theodolites suitable for the required purpose. I would strongly recommend the pattern made by Messrs. Troughton and Simms which is fitted with reading micrometers instead of verniers as these have been proved to be very suitable for the class of work required.

5. With reference to the conditions under which Captain Fraser is deputed, I observe that the 1st October is laid down by His Excellency in Council as the date by which Captain Fraser must return to India, in the event of his taking furlough. I would venture to point out that if, as seems very probable, the instruments cannot be ready and available in India by the 1st October, there would be no object, departmentally, in bringing Captain Fraser out by that date, as no suitable employment could be found for him for such portion of the field season as would elapse before the instruments were available. So far therefore as the work in connection with the magnetic survey is concerned, it would be advantageous to the department if Captain Fraser, should he care to avail himself of leave, were allowed to prolong his leave beyond the 1st October until such time as the instruments would be ready.

6. I would also suggest, for your consideration, that the Government of India be moved to ask the Secretary of State to obtain permission from the Royal Society for Captain Fraser to be allowed to visit Kew for instructional purposes, and also that Professor Rücker be asked to kindly give Captain Fraser what advice and assistance may be necessary to him.

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, JUNE, 1899.

Deputation of Capt. Fraser to Eng. in con. with Magnetic Survey of India, etc. [Pros. No. 11

No. 10.] No. 1705—16-5, dated Simla, the 26th May 1899. Serial No. 5.
From—E. MACONOCHE, Esq., Under-Secretary to the Government of India,
To—The Surveyor General of India.

WITH reference to your letter No. 9 S.—S., dated the 11th May 1899, I am directed to request that an emergent indent for six theodolites required in connection with the fundamental magnetic survey of India may be submitted at an early date for transmission to the India Office.

No. 11.] No. 121 S.—S., dated Simla, the 29th May 1899. Serial No. 6.
From—MAJOR-GENERAL C. STRAHAN, R. E., Surveyor General of India,
To—The Secretary to the Government of India.

WITH reference to your letter No. 1705—16-5, dated the 26th instant, I have the honour to submit herewith an emergent indent, in triplicate, for six theodolites required for the magnetic survey.

GOVERNMENT OF INDIA.

DEPARTMENT OF REVENUE AND AGRICULTURE.

METEOROLOGY.

To

THE RIGHT HONOURABLE LORD GEORGE F. HAMILTON,
Her Majesty's Secretary of State for India.

Simla, the 8th June 1899.

MY LORD,

WITH reference to the correspondence ending with your Lordship's telegram, dated 2nd May 1899, we have the honour to forward a copy of a letter from our Surveyor-General, No. 9-S. S., dated 11th May 1899, and enclosure on the subject of the deputation of Captain H. A. D. Fraser, R.E., to England to make arrangements for the conduct of the fundamental magnetic survey of India.

2. With regard to the proposal made in paragraph 3 of the Surveyor-General's letter, we have instructed him to submit, for transmission to the India Office, an emergent indent for the theodolites, and we would ask that Captain Fraser may be allowed to arrange for the purchase of the magnetic instruments in communication with the India Office.

3. If, as is probable, it is necessary to have the magnetic instruments specially made they may not be ready in time to admit of work being begun on the 1st October next, the date mentioned in our despatch No. 27 of 30th March last. In that case we shall have no objection to Captain Fraser being granted such extension of leave as may be admissible to him within the period necessary for the completion of the instruments.

4. We would also ask your Lordship to obtain permission from the Royal Society for Captain Fraser to visit Kew for the purpose of consulting Professor Rücker.

We have the honour to be,

MY LORD,

Your Lordship's most obedient, humble Servants,

CURZON OF KEDLESTON.

W. S. A. LOCKHART.

E. H. H. COLLEN.

C. M. RIVAZ.

C. E. DAWKINS.

T. W. RALEIGH.

R. GARDINER.

No. 1880—26-7.

COPY of the correspondence forwarded to the Finance Department for information in continuation of endorsement No. 1393—16-3, dated 3rd May 1899.

By order,

E. MACONOCHIE,

Under-Secy. to the Govt. of India.

LIST OF ENCLOSURES.

Letter from the Surveyor-General of India, No. 9-S. S., dated 11th May 1899, and enclosure.

File No. 16 of
1899.

Serial No. 7.

No.

1899.

GOVERNMENT OF INDIA.

DEPARTMENT OF REVENUE AND
AGRICULTURE.

METEOROL OGY.

No. 38, DATED SIMLA, THE 8TH JUNE 1899.

(C o p y .)

*Letter to Her Majesty's Secretary of State
for India.*

SUBJECT.

Captain Fraser's deputation to England to
make arrangements for the conduct of the
fundamental magnetic survey of India.

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, JUNE, 1899.

Deputation of Capt. Fraser to Eng. in con. with Magnetic Survey of India, etc. [Pros. No. 14]

No. 13.]

No. 60, dated Simla, the 8th June 1899.

Serial No. 8.

From—E. MACONOCHE, Esq., Under-Secretary to the Government of India,

To—Her Majesty's Under-Secretary of State for India.

I AM directed to forward an emergent indent (in duplicate) from the Surveyor General of India for six theodolites required for the fundamental magnetic survey of India and to recommend that the indent may be complied with.

The need for the instruments is explained in Despatch No. 38 of to-day's date.

No. 14.]

Extract, paragraph 1, from letter No. 138 S., dated 30th May 1899, from the Surveyor General of India, to the Secretary to the Government of India, Department of Revenue and Agriculture.

WITH reference to your No. 1393—16-3, dated the 3rd instant, I have the honour to forward a copy of letter No. 1779, dated the 23rd idem, reporting that Captain Fraser, R. E., was relieved of his duties on the afternoon of the 17th May 1899 with a view to his proceeding to England on deputation.

* * * * *

No. 1779, dated the 23rd May 1899.

From—The Superintendent, Trigonometrical Surveys,

To—The Assistant Surveyor General, in charge Surveyor General's Office.

IN continuation of this office letter No. 1712, dated 17th May 1899, I have the honour to inform you that Captain H. A. D. Fraser, R.E., was relieved of his duties in this office on the afternoon of the 17th May 1899, with a view to his proceeding to England on deputation.

No. 1935—16-9, dated Simla, the 12th June 1899.

Endorsed by the DEPARTMENT OF REVENUE AND AGRICULTURE.

COPY forwarded to the Comptroller, India Treasuries, for information.

A Pros.,
May 1899,
No. 1.

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, JUNE, 1899.

· Reorganization of Indian Observatories.

[Pros. No. 15

REORGANIZATION OF INDIAN OBSERVATORIES.

[Proceedings—Nos. 15 to 24.]

No. 15.]

File No. 17 of
1899.
Serial No. 1.

No. 370 (Public), dated Fort St. George, the 23rd March 1899.

From—G. STOKES, Esq., Chief Secretary to the Government of Madras, Public Department,

To—The Secretary to the Government of India, Department of Revenue and Agriculture (Meteorology).

In acknowledging the receipt of your letter No. 873, dated 8th March 1899, intimating that it is proposed to give effect, from the 1st April 1899, to the arrangements under which the control of the Madras Observatory and the funds connected with it will be transferred to the Government of India, I am directed to bring to the notice of the Government of India that the scale of establishment proposed by Mr. Eliot for the performance of meteorological work in the Madras Observatory, in his letter No 410-S., dated 29th May 1896, which formed an enclosure to your No. 2541—11, dated 19th October 1896, provides for reduced rates of pay to the three senior subordinates in Miss Pogson's office, who will be transferred to the Observatory, and that nothing is said in the correspondence as to securing present incumbents against loss of emoluments. The existing rates of pay and those proposed by Mr. Eliot are shown below :—

	Present pay.	Proposed pay.
1st Assistant ...	Rs. 60—80 <i>plus</i> Rs. 15 local allowance for publication of the daily weather report.	Rs. 55—70
2nd „ ... „	40—55 „ „ 10 „ „	„ 40—50
3rd „ ... „	30—40 „ „ 5 „ „	„ 32-8-0

2. The scale proposed for the Madras Astronomical Department provides for a Computer on Rs. 100 and two Assistants on Rs. 60 and Rs. 40 per mensem respectively, while the establishment of the Kodaikanal Solar Physics Department includes four Assistants on Rs. 150 to Rs. 250, Rs. 100 to Rs. 150, Rs. 65 to Rs. 85 and Rs. 50 to Rs. 75. This Government has no information as to whether the Assistants in the Meteorological office are competent to do the work required of the subordinates in the other two branches, but I am to say that the Governor in Council hopes that the Government of India will be able to protect the rights of existing incumbents either by a redistribution of the duties among individuals, or by permitting the present holders of the posts in the Meteorological office to retain their salaries until they retire or are promoted.

3. I am further to refer to my letter No. 227, Public, dated 23rd February 1899, in which the Government of India was informed that Mr. Michie Smith was then moving to Kodaikanal, and had applied to this Government for the grant to his subordinates of increased pay in consideration of their transfer to a hill station. Pending a reply to my letter quoted above, this Government did not sanction the allowances asked for. I am now to suggest that the compensation which it is necessary to allow the members of the establishment should be granted not as a special allowance, but by admitting them from the date of their arrival at Kodaikanal to the increased pay which they will receive under the new scheme. I am to request that the Government of India may be moved to pass orders accordingly.

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, JUNE, 1899.

Reorganization of Indian Observatories.

[Pros. No. 19]

No. 16.]

Telegram dated the 2nd April 1899.

Serial No. 2.

From—Madras,

To—Simla.

From—Revenue Secretary,

To—Revenue Secretary.

YOUR letter 873 8th ultimo. At Eliot's request services of R. L. Jones, Professor of Physics, Presidency College, are placed at disposal of Government of India for half-time appointment of Superintendent, Madras Observatory and Meteorological Office. Jones took charge forenoon first instant. Please notify appointment.

No. 17.]

No. 1541, dated Bombay Castle, the 10th April 1899.

Serial No. 3.

From—R. B. STEWART, Esq., I.C.S., Acting Secretary to the Government of Bombay,
General Department,

To—The Secretary to the Government of India.

A Pros.,
March 1899,
Nos. 1 and 2.

IN reply to Mr. Under-Secretary Maconochie's letter No. 434—9-21, dated the 9th February 1899, regarding the proposed reorganization of Indian Scientific Observatories, I am directed to state, for the information of the Government of India, that there is no objection to Mr. N. A. Moos retaining a lien on his appointment in the Educational Department until the future position of the Colaba Observatory is finally determined by the Government of India.

No. 18.]

No. 1236—17-4, dated Simla, the 20th April 1899.

Serial No. 4.

NOTIFICATION—By the Government of India.

MR. R. L. JONES, Professor of Physics, Presidency College, Madras, is appointed Meteorological Reporter to the Government of Madras and Deputy Director of the Madras Observatory, with effect from the forenoon of 1st April 1899.

No. 1237—17-4.

COPY forwarded to the Government of Madras for information, with reference to their telegram of the 2nd April 1899.

No. 1238—17-4.

COPY, with copy of the telegram from the Government of Madras, dated 2nd April 1899, forwarded to the Meteorological Reporter to the Government of India for information, with reference to the correspondence ending with this Department letter No. 875—9-24, dated 9th March 1899.

No. 19.]

No. 325 S., dated Simla, the 25th April 1899.

Serial No. 5.

From—JOHN ELIOT, Esq., Meteorological Reporter to the Government of India,

To—The Secretary to the Government of India.

I HAVE the honour to submit a brief report of my visit to the Colaba and Madras observatories in the last fortnight of March, in accordance with your verbal instructions, to make any arrangements necessary for the transfer of the observatories from Provincial to Imperial control.

2. I arrived in Bombay (from Vizagapatam where I attended the annual meeting of the observatory and heard the concluding part of the observatory case) on the 20th and left on the 22nd. I met Mr. Moos twice and explained to him the nature of the changes and went with him to the Accountant General to ascertain what arrangements would be necessary in order to enable the Director of the Colaba Observatory to draw the amounts of the observatory bills on and from the 1st of April 1899. In accordance with the advice of the Accountant General I telegraphed to the Controller, asking him to issue a letter of credit for the amount of the grant for the Colaba Observatory in 1899-1900 to the Accountant General, Bombay, against which the bills of the Colaba Observatory could be drawn. I had no reply from the Controller, but was informed by my office in Calcutta through which I took the action that the necessary letter of credit had been issued to Bombay.

3. From Bombay I proceeded to Madras where I arrived on the morning of the 27th March 1899; Mr. Michie Smith came in from Kodaikanal on the same day.

4. I went to see Miss Cogson on that day and told her that she would be pensioned off from the morning of the 1st of April and that she must be prepared to hand over charge on the morning of that day, and also to send over all the office furniture, correspondence,

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, JUNE, 1899.

Pros. No. 19]

Reorganization of Indian Observatories.

library, lithographic presses, etc., to the observatory not later than the evening of the 31st. Miss Pogson about this time pointed out that she had not received due notice and that she intended to apply for payment of her full salary during the next three months. I told her that she must apply officially, and that I could neither promise nor do anything in Madras on this point.

5. I then proceeded to arrange for the appointment of her successor. The only officer in Madras qualified to take up the double appointment was Mr. R. L. Jones, Professor of Physics of the Presidency College. He returned from furlough on the day preceding my arrival. I first saw him and found he was willing to take up the appointment and then proceeded to the Secretariat, and learnt that the Madras Government were ready to agree to this arrangement, but had had no letter from the Government of India, asking that his services as a half-time officer might be placed at the disposal of the Government of India.

6. In anticipation of the necessary action of the Government of India, applied for by the Government of Madras, I arranged that Mr. Jones should prepare to take over charge on the morning of the 1st April 1899, and that he should arrange for the transfer of the Meteorological office to the observatory buildings.

7. I then interviewed the Accountant General by whose advice I telegraphed to the Comptroller, India Treasuries, through my Calcutta office, asking that letters of credit should be issued to the Madras and Kodaikanal Treasuries to meet establishment bills and other charges for the present year. This was, I was told by my office, done.

8. I also talked over with Mr. Michie Smith during this period, of the progress at Kodaikanal, and the probable additional requirements, so that I might be prepared to advise Government when his application for these comes up.

9. I left Madras for a couple of days to inspect an observatory whilst the Meteorological office was being transferred to the observatory, and returned on the morning of the 1st and assisted in making the various changes required by the orders of Government. Before I left Madras I wrote a letter to the Chief Secretary, informing him of my action and received a reply expressing the approval of the Government of Madras. I enclose a copy of this for the information of the Government of India.

Extract from the Proceedings of the Government of Madras,—No. 392 Public, dated 3rd April 1899.

READ again the following paper:—

G. O. No. 369 Public, dated 3rd March 1899.

ORDER.—In continuation of the G. O. above quoted the services of Mr. R. L. Jones, Professor of Physics, Presidency College, will be placed at the disposal of the Government of India for appointment, in addition to his own duties, as Superintendent of the Madras Observatory and the Madras Meteorological office. The Government of India will be informed accordingly by telegraph.

2. It is understood that under instructions from the Meteorological Reporter to the Government of India, Mr. Jones took charge of his new duties on the forenoon of 1st April 1899, and that the changes indicated in the papers printed with the G. O. read above, were carried into effect by Mr. Eliot on the same date. The arrangements made by Mr. Eliot are approved by Government.

No. 20.]

No. 1540—17-6, dated Simla, the 12th May 1899.

Serial No. 6.

NOTIFICATION—By the Government of India.

IN consequence of the transfer of the Madras, Kodaikanal and Colaba Scientific Observatories from Provincial to Imperial control, the following appointments are made with effect from the 1st April 1899:—

Mr. J. Eliot, C.I.E., Meteorological Reporter to the Government of India, to be Meteorological Reporter to the Government of India and Director General of Indian Observatories.

Mr. C. Michie Smith, Government Astronomer, Madras, to be Director of the Kodaikanal and Madras Observatories.

Mr. N. A. Moos, to be sub. *pro tem.* Director of the Colaba Observatory, Bombay.

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, JUNE, 1899.

Reorganization of Indian Observatories.

[Pros. No. 20

No. 1541—17-6.

COPY forwarded to the Meteorological Reporter to the Government of India and the Director General of Indian Observatories for information, in continuation of endorsement No. 1238—17-4, dated the 20th April 1899.

No. 1542—17-6.

COPY forwarded to the Government of Madras for information, in continuation of endorsement No. 1237—17-4, dated 20th April 1899.

No. 1543—17-6.

• COPY forwarded to the Government of Bombay for information, with reference to the correspondence ending with Mr. Stewart's letter No. 1541, dated the 10th April 1899.

No. 1544—17-6.

COPY forwarded to the Finance Department for information, in continuation of endorsement No. 874—9-24, dated the 9th March 1899.

FROM

E. MACONCHIE, Esq., I.C.S.,
Under-Secretary to the Government of India,

TO

Dept. of Rev. Agri.
Meteorology.

Simla, the 30th May 1899.

SIR,

I AM directed to inform you that, in consequence of the transfer of the Madras, Kodaikanal and Colaba Scientific Observatories from provincial to imperial control, the following appointments have been made with effect from the 1st April 1899:—

Mr. J. Eliot, F.R.S., C.I.E., Meteorological Reporter to the Government of India has been appointed Meteorological Reporter to the Government of India and Director General of Indian Observatories.

Mr. C. Michie Smith, Government Astronomer, Madras, has been appointed Director of the Kodaikanal and Madras Observatories.

Mr. N. A. Moos has been appointed *sub. pro tem.* Director of the Colaba Observatory, Bombay.

I have the honour to be,

SIR,

Your most obedient Servant,

E. MACONCHIE,

Under-Secretary to the Govt. of India.

The Secretary to the	Government of	Madras.
"	"	Bombay.
"	"	Bengal.
"	"	the North-Western Provinces and Oudh.
"	"	the Punjab.
"	"	Burma.
"	Chief Commissioner,	Central Provinces.
"	"	Assam.
"	"	Coorg.
"	"	Ajmere.
"	Resident at	Hyderabad.

Circular No. 20—17-7.

Home.
Finance and Commerce.
Military.
Public Works Department.
Foreign.

Copy forwarded to the Departments of the Government of India noted in the margin for information.

By order,

E. MACONCHIE,

Under-Secy. to the Govt. of India.

COPY forwarded to—

The Surveyor-General of India,
The Inspector-General of Forests,
The Director, Geological Survey of India,
The Meteorological Reporter to the Government of India and Director General of Indian Observatories,
The Inspector-General of the Civil Veterinary Department,
The Director, Botanical Survey of India,
The Reporter on Economic Products,
The Honorary Secretary, Trustees, Indian Museum,
The Assistant Agricultural Chemist to the Government of India,
for information.

By order,

E. MACONCHIE

Under-Secy. to the Govt. of India.

From—JOHN ELIOT, Esq., Meteorological Reporter to the Government of India,
and Director-General of Indian Observatories,

Serial No. 8.

To—The Secretary to the Government of India, Department of Revenue and
Agriculture.

I have the honour to forward two petitions received from the First and Second Assistants in the Madras Meteorological Office for the consideration and orders of the Government of India.

2. The petitioners were the First and Second Assistants of the Madras Meteorological Office under Miss Pogson. Their pay was (as given in paragraph 49 of my No. 410, dated 29th May 1896) as follows:—

A., November 1896, Nos. 1-7.

	Paid out of budget grant of India Meteorological Depart- ment.	Paid out of contribu- tion of Madras Government made to India Meteorological Depart- ment towards the publication of the Daily Weather Report.
	Rs.	Rs.
First Assistant	60 to 80	15
Second Assistant	40 to 55	10

3. These two clerks, when the Meteorological Office was transferred to the observatory on the 1st April 1899, accepted the posts of First and Second Assistants under the new scheme for the working of the Madras Meteorological Office. The pay of the First Assistant under the scheme, as sanctioned by the Government of India, is Rs. 55 to 70 and of the Second Assistant Rs. 40 to 50. They however told me when I asked them if they wished to remain as First and Second Assistants in the Madras Meteorological Office that they believed they were entitled by the rules of the Civil Service Regulations to their former pay and not to the reduced pay as sanctioned for the future incumbents of these posts. I told them that their proper course was to submit a formal application stating fully their claims and quoting the articles of the Civil Service Regulations on which they based their application. The clerks in question have hence submitted the accompanying petitions. I also forward in further explanation of their claims a letter of the First Assistant accompanying his petition.

4. I have the honour to ask that the Government of India will be pleased to decide whether it in accordance with Article 173 of the Civil Service Regulations, will, allow them to continue on their old pay and postpone the change of the pay of the posts until they vacate these posts, and if not whether they may be allowed in view of the considerable reduction in the pay of these posts to commence with the maximum pay of these posts as now sanctioned. I believe by Article 171-A they are entitled to the maximum pay and that I can sanction but of this I am not quite sure.

Dated 30th April 1899.

From—N. E. KANGAYAM PILLAY, 1st Assistant, Madras Meteorological Office,

To—The Meteorological Reporter to the Government of India.

I most humbly beg to submit herewith an application to the Government of India praying for the issue of necessary orders to restore me to my original

salary. I am entitled to the concession therein prayed for by articles 173 and 468 of the Civil Service Regulations and in accordance with the usual practice, and I humbly request that you will be generously pleased to forward the application with your strong recommendation as you kindly promised during your last visit to Madras which afforded me a favourable opportunity of representing my claims to you in person.

Having learnt sometime back that the amalgamation of the Madras Meteorological Office with the Madras Observatory would soon be effected, and not knowing whether it would be advantageous to my position or otherwise, I submitted a petition to Miss E. Isis Pogson, the late Meteorological Reporter to the Government of Madras, requesting her to point out the propriety (justification) of my claims to you so that you might address the Government of India in time, should such a course be found necessary. She was kind enough to forward it in January last, but probably it was too late. From the reply received from your office, however, namely that a reply to it would be sent as soon as orders were received from the Government of India and from the original scheme sanctioned in 1893, I was confident that I would not be a loser by the change, but to my utter disappointment and great misfortune I regret to state that my salary was considerably reduced while the Kodaikanal and the Madras sections of the Madras Observatory had an advantage inasmuch as every one there got an increase to his pay.

I have also been very miserable in my domestic life. Miss Isis Pogson, the late Meteorological Reporter to the Government of Madras, is personally aware of the series of calamities I have had and my very narrow circumstances. I shall not trouble you with the details of my private life, but I trust that you will be able to realize my actual difficulties and the great distress in which the reduction of my salary will place me.

It has been your immense kindness that obtained sanction of Government for the grant of pension to our late reporter for her non-pensionable services of the appointment, and I most respectfully beg that you will generously extend that kindness to me, an injured servant of yours, who served the Meteorological Department with zeal for over 17 years and who depends solely upon your sympathy and support for the protection of his rights and restoration to his original salary.

Hoping that you will kindly save me, my family and children from the great difficulties to which we will otherwise be put and praying to be pardoned for intruding upon a few of your most precious moments.

Madras, 25th April 1899.

TO—HIS EXCELLENCY THE GOVERNOR-GENERAL IN COUNCIL, SIMLA.

Through the Meteorological Reporter to the Government of India, Calcutta, and the Meteorological Reporter to the Government of Madras.

The humble petition of N. E. KANGAYAM PILLAY,
First Assistant of the Madras Meteorological Office.

RESPECTFULLY SHEWETH,

1. That the Petitioner has been employed in the Madras Meteorological Office from March 1882, and been drawing a salary of Rs. 95 per mensem till recently including the Weather Report allowance of Rs. 15* granted for the "Madras Daily Weather Report" in October 1893.

* A, August 1894, Nos. 4-19.

2. That the amalgamation of the Madras Meteorological Office with the Madras Observatory, which was brought into force on the 1st April 1899, has reduced the Petitioner's pay to a grade of Rs. 55 to 70 with no allowance hitherto granted for the Weather Report.

3. That the petitioner begs to submit that such reduction should affect only his successors as Government does not usually interfere with the present incumbents of the appointments reduced, but either rules that reduction should be effected as soon as the present incumbent retires or vacates his appointment, or grants a personal allowance equal to the difference between the old and the reduced salary (*vide* Articles 173 and 468, Civil Service Regulations), that this is generally done, and that there are instances of the kind in most offices of both the Local and Imperial Departments.

4. That he further begs to point out that the extra allowance for the Weather Report work was granted for the specially arduous nature of the duties requiring the Assistants' attendance even on public holidays and Sundays.

5. That it is needless to state how great a hardship it is for the Petitioner, after having drawn Rs. 95 per mensem for so long a time, and while within a few years to complete service, to be now suddenly deprived of a portion of his emoluments—a portion which is considerable being more than one-fourth of his salary—which would necessarily put the Petitioner, his family and children into great difficulties.

6. That the Petitioner prays, therefore, that the Government of India will be graciously pleased to extend either of the usual concessions in his case, in consideration of his approved and long service in the Meteorological Department where the Petitioner has almost grown old.

7. That he further begs to add that the Meteorological Reporter to the Government of India has protected the rights of the Petitioner in paragraph 52 of his letter No. 410* S., dated 29th May 1896, referred to in Madras Government Order No. 369, dated 23rd March 1899 Public, where he states that 'the First and Second Assistants and the Rainfall Clerk are retained on their present pay together with the amounts of local allowances hitherto given to the First, Second and Third Assistants,' and that when he came to Madras recently to carry out the new arrangements, he also kindly promised to recommend the Petitioner's case for favourable consideration.

* A, November 1896, Nos. 1-7.

He begs to remain,

His Excellency's most obedient and humble servant,

N. E. KANGAYAM PILLAY,

First Assistant, Madras Meteorological Office

TO—HIS EXCELLENCY THE GOVERNOR-GENERAL OF INDIA IN COUNCIL, SIMLA:

Through the Meteorological reporters to the Government of India and Madras.

The humble petition of G. Narayanasawmy Naidu, second

Assistant of the Madras Meteorological Office.

MOST RESPECTFULLY SHEWETH,

1. That the Petitioner has been employed in the Madras Meteorological Department since August 1880 and has been drawing a scale of pay Rs. 40—55 since 1891, with a Weather Report allowance of Rs. 10 per mensem since the introduction of the Madras Daily Weather Report in 1893.

2. That owing to a reduction recently sanctioned in connection with the amalgamation of the Madras Meteorological Office with the Astronomical Observatory, the pay of Your Excellency's Petitioner was reduced to Rs. 40—50, from the date on which the above change came into effect, *viz.*, 1st April 1899, and the extra allowance hitherto drawn was stopped.

3. That the Petitioner begs to point out that the extra allowance was granted in consideration of the constant and more exacting nature of the Weather Chart work, which requires the attendance of the assistants even on Sundays and other public holidays.

4. That it is hardly necessary for the Petitioner to point out how great a hardship it is for him to be suddenly deprived of a portion of his emoluments after having drawn Rs. 65 for so long a time and while within a few years to complete his service.

5. That the Petitioner begs to submit that the reduction should only affect his successors in the ordinary course.

6. That in such cases, Government does not generally interfere with the present incumbents but, either rules that such reduction should be carried after the incumbent retires or is provided with any other suitable appointment, or grants as personal allowance the difference between the old and the new salary—*vide* Articles 173 and 468 of the Civil Service Regulations—instances of which there are in almost all offices.

7. That the Petitioner therefore prays that Your Excellency's Government will be graciously pleased to extend either of the concessions to his case, in consideration of his long and satisfactory services in the Department.

8. That the Petitioner further begs to state that the Meteorological Reporter to the Government of India promised to support his cause when he came down to Madras to carry out the changes, on a representation being made to him.

That the Petitioner begs to remain,

H. E.'s most obedient and humble servant,

G. NARAYANASAWMY NAIDU,

2nd Assistant, Madras Meteorological Office.

MADRAS,

24th April 1899. }

No. 23,]

No. 421-S., dated Simla, the 30th May 1899.

From—JOHN ELIOT, ESQ., Meteorological Reporter to the Government of India
and Director-General of Indian Observatories,

To—The Secretary to the Government of India, Revenue and Agricultural
Department.

I HAVE the honour to forward the accompanying correspondence from Mr. Michie Smith, Director of the Kodaikanal Observatory, in which he asks for hill allowances to be granted to the assistant and peon who accompanied him last January to Kodaikanal. As there are no definite hill allowances laid down for Kodaikanal in the Civil Service Regulations, he asks that they may be given such allowances as may be considered proper for them.

During the period from January to the end of March 1899 the Kodaikanal Observatory establishment was under the Government of Madras. That Government has, in its No. 370, dated 23rd March 1899, included in a file recently sent to me for opinion, made a suggestion to the Government of India on this matter, and hence I forward this correspondence because it gives information from which the cost of the concession asked for can be estimated.

I also submit the correspondence as received from Mr. Michie Smith in order to receive instructions from the Government of India what reply, if any, I should make.

Dated Madras, the 2nd January 1899.

From—The Government Astronomer,

To—The Chief Secretary to the Government of Madras.

I have the honour, with reference to G. O. No. 1468, dated 6th December 1898, to request permission to move to Kodaikanal at an early date, taking with me one assistant and one peon.

2. I have the honour to request that the assistant and peon may be permitted to draw the usual hill allowance while they are at Kodaikanal till such time as the formal transfer to the Government of India takes place when they will draw increased pay.

Dated Madras, the 25th January 1899.

From—The Government Astronomer,

To—The Chief Secretary to the Government of Madras.

With reference to paragraph 2* of G. O. No. 84 (Public), dated 19th January 1899, I have the honour to suggest that the

* Stating that there was no usual hill allowance for the Palanis and that the Government Astronomer should make a definite proposal.

assistant, whose present pay is Rs. 44, and that the peon, whose pay is Rs. 10, be granted the same local allowance as they would draw if they accompanied the Government to Ootacamund.

No. 14, dated Kodaikanal, the 11th May 1899.

From—The Government Astronomer,

To—The Meteorological Reporter to the Government of India.

I have the honour to forward herewith a copy of certain correspondence with the Government of Madras to which I have not yet received any reply.

2. As it was quite impossible for the assistant and peon to live here on what they were drawing in Madras, I had myself to make advances to them, and I have the honour to request that permission may be given to draw such allowance as may be considered proper for them.

FROM

E. MACONOCHIE, Esq., C.S.,
Under-Secretary to the Government of India,

TO

THE METEOROLOGICAL REPORTER TO THE
GOVERNMENT OF INDIA AND DIRECTOR-
GENERAL OF INDIAN OBSERVATORIES.

Dept. of Rev. & Agri.
Meteorology.

Simla, the 29th June 1899.

SIR,

WITH reference to your letter No. 2290, dated 26th May 1899, regarding the pay to be drawn by the First and Second Assistant of the Madras Meteorological Office, I am directed to say that the two Assistants having drawn for some time the maximum pay of the posts abolished, *viz.*, Rs. 80 and Rs. 55, respectively, are entitled to the maximum pay of the corresponding posts sanctioned under the new scheme for Indian scientific observatories, *viz.*, Rs. 70 and Rs. 50, respectively. In order to save them as far as possible from loss of pay the Government of India sanction the grant to each of them of a personal allowance equal to the difference between the maximum pay of the new posts and of the old ones, that is, in the case of the First Assistant Rs. 10 per mensem and of the Second Assistant Rs. 5 per mensem. These orders will take effect from the 1st April 1899.

2. With reference to your letter No. 421-S., dated 30th May 1899, regarding the grant of hill allowances to the assistant and peon who accompanied Mr. Michie Smith to Kodaikanal in January last, I am to say that the Government of India sanction their drawing from the date of their arrival at Kodaikanal the increased pay which they now receive under the new scheme.

I have the honour to be,

SIR,

Your most obedient servant,

E. MACONOCHIE,

Under-Secy. to the Govt. of India.

No. 2186—17-10.

Letter from the Government of Madras, No. 370, dated 23rd March 1899.

Letter from the Meteorological Reporter to the Government of India, etc., No. 2290, dated 26th May 1899.

Letter from the Meteorological Reporter to the Government of India, etc., No. 421-S., dated 30th May 1899, and enclosure.

Copy of correspondence forwarded to the Finance Department for information.

No. 2187—17-10.

Copy forwarded to the Government of Madras for information, with reference to their letter No. 370, dated 23rd March 1899.

By order,

E. MACONCHIE,

Under-Secy. to the Govt. of India.

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, JUNE, 1899.

Improvement in present system of warnings of storms and floods in India. [Pros. No. 25]

IMPROVEMENT IN THE PRESENT SYSTEM OF WARNINGS OF STORMS AND
FLOODS IN INDIA.

[Proceedings—No. 25.]

No. 25]

No. 643 R. C., dated Simla, the 9th July 1889.

File No. 10 of
1899.
Serial No. 11.

From—MAJOR M. C. BRACKENBURY, R.E., *Under-Secretary to the Government of India*, PUBLIC WORKS DEPARTMENT,

To—The Joint Secretaries to the Governments of Madras and Bombay (Railway Branch), Public Works Department, and the Secretaries to the Governments of Bengal, the North-Western Provinces and Oudh and the Punjab, Public Works Department.

- „ Chief Commissioners of the Central Provinces, Burma, Assam and Coorg.
- „ Resident at Hyderabad and in Mysore.
- „ Agents to the Governor General for Rajputana, Central India and Baluchistan.
- „ Director General of Railways.
- „ Consulting Engineers to the Government of India for Railways, Calcutta, Lucknow and Central Division.

I AM directed to request that you will inform officers of the Public Works Department who may be employed at any time under your orders on important works situated on, or connected with, important waterways or drainage areas, that, should they desire to receive warnings of any unusual rainfall which is likely to cause extraordinary floods and thereby cause damage or delay the progress of the works under them, they must inform the Meteorological Department of the Government of India at Simla that they wish for such warnings, and supply that Department with full information as to the area on which, during any particular season of the year, exceptional rainfall would affect their works.

2. The officer in charge of such a work should apply direct to the Meteorological Reporter to the Government of India, Simla, and should send with his application a sketch map showing the catchment area the rainfall over which would seriously affect the work, and state the period of time during which he would wish to have warnings sent him.

No. 1146 R. C., dated Simla, the 16th June 1899.

From—C. J. COLE, Esq., *Under-Secretary to the Government of India*, PUBLIC WORKS DEPARTMENT,

To—The Secretaries to the Governments of Madras, Bombay, Bengal, the North-Western Provinces and Oudh, the Punjab and Burma, Public Works Department.

- „ Agents to the Governor General for Rajputana, Central India, and Baluchistan, Public Works Department.
- „ Resident at Hyderabad and in Mysore, Public Works Department.
- „ Consulting Engineers to the Government of India for Railways, Calcutta, Lucknow and Assam.
- „ Director General of Telegraphs.
- „ Managers, North Western, Oudh and Rohilkhand, East Coast and Eastern Bengal Railways.
- „ Engineers-in-Chief, Ghaziabad-Moradabad and Hurdwar-Dehra Railways.
- „ Engineer-in-Chief, Indus Bridge Works and Shadipalli-Balotra Railway (British Section).
- „ Engineer-in-Chief, Godavari Bridge Works.
- „ Engineers-in-Chief, Kohat-Bunno, Bara-Ajmere and Marwar, and Rana-ghat-Ganges Katihar Railway Surveys.

IN inviting attention to Government of India, Public Works Department, Circular No. 1 Railway, dated the 16th March 1899, with which was forwarded a copy of Revenue and

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, JUNE, 1899.

Pros. No. 25] Improvement in present system of warnings of storms and floods in India.

Agricultural Department Circular No. 26—35-3, dated 9th November 1898, in regard to the improvement in the present system of warnings for storms and floods in India, I am directed to remind you that applications for the warnings in question should be submitted in accordance with the instructions on the subject contained in Government of India, Public Works Department Circular No. 643 R. C., dated the 9th July 1889, copy herewith enclosed for ready reference.

No. 1147 R. C.

A Pros.,
June 1899, Copy forwarded to the Revenue and Agricultural Department, for information, with
Nos. 1 to 6. reference to correspondence ending with Public Works Department memorandum No. 825
R. C., dated 6th May 1899.

No. 2193—10-11, dated Simla, the 30th June 1899.

Endorsed by the DEPARTMENT OF REVENUE AND AGRICULTURE.

COPY forwarded to the Meteorological Reporter to the Government of India and Director General of Indian Observatories for information, with reference to the correspondence ending with letter No. 1860—10-10, dated 7th June 1899, from the Department of Revenue and Agriculture.

PROCEEDINGS

OF

THE DEPARTMENT OF REVENUE AND AGRICULTURE

FOR

JULY, 1899.

METEOROLOGY.

[Proceedings—Nos. 1 to 4.]

ADDITIONS REQUIRED TO COMPLETE THE OBSERVATORY BUILDINGS AT KODAIKANAL.

No. 1.]

No. 301 S., dated 19th April 1899.

File No. 27 of
1899.
Serial No. 2.

*From—J. ELIOT, Esq., F.R.S., Meteorological Reporter to the Government of India,
and Director General of Indian Observatories,*

To—The Secretary to the Government of India.

I HAVE the honour to forward a letter, in original, from the Director of the Kodaikanal Solar Physics Observatory, informing the Government of India that there will be very considerable savings in the original estimate of the cost of buildings for the Kodaikanal Observatory, and suggesting that a portion of the savings may be utilized to carry out certain additions and extensions necessary or desirable for the completion of the observatory.

2. The total savings in the original estimate is stated by Mr. Michie Smith to be about Rs16,000.

3. He proposes that the following additions should be made :—

- (1) Erection of a house for one of the Assistants at a cost of Rs2,000.
- (2) Erection of small tower for the accommodation of the wind instruments, more especially of an anemograph. The cost of this is not stated.
- (3) Erection of a small workshop for the mechanic at the cost of Rs250.
- (4) Erection of a small building for the transit instrument to give exact time. The cost is estimated at Rs300.
- (5) Book cases, etc., for the large library of astronomical works belonging to the observatory, the accumulation of over fifty years' exchange, and purchase. No estimate of cost is provided.

With respect to the 1st, I am enquiring as to the circumstances that necessitate this building for which apparently no provision was originally made. I have also called for estimates for the anemograph tower. The consideration of the first and second suggestions or proposals may hence be left over for the present. The third, fourth and fifth items appear to be absolutely essential, and I would recommend that they should be sanctioned as early as possible.

4. Mr. Michie Smith also suggests the following as desirable, if not necessary :—

- (1) A small grant of Rs1,000 for laying out the grounds of the Observatory.
- (2) The provision of mats for the floors of the Assistants' houses.
- (3) The provision of additional out-houses.
- (4) The erection of a small building to house the observer in charge at the low level station of Periakulam where it is proposed to record systematic meteorological observations for comparison with those at Kodaikanal.
- (5) Appointment of a European Sergeant to act as Writer and to assist generally in looking after the observatory.

5. With respect to the above it would, I think, be desirable to sanction 1, 2 and 3. The cost for 1 and 3 will be small, and these additions will contribute largely towards the comfort

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, JULY, 1899.

Pros. No. 1] Additions required to complete observatory buildings at Kodaikanal.

of the observers and the proper sanitation of the Observatory; 2 will probably not entail an expenditure exceeding R250. The cost of taking up furniture, etc., from Madras to Kodaikanal is great, and will entail heavy initial expenditure on the part of the Assistants (transferred from the Madras Astronomical Observatory) which they are ill prepared to bear. Hence I would recommend that this concession should be made.

6. The establishment of a Meteorological Observatory at the foot of the Palni hills is most desirable. The meteorological observations at Kodaikanal will acquire double value by comparison with the observations at a station at the foot of the hills. Periakulam is admirably situated for the purpose of a base station, and I hence beg to advise Government to sanction the establishment of an observatory there, including the cost of a small building to house the observer at a cost not exceeding R2,000.

7. The last suggestion, *viz.*, the appointment of a Sergeant as Writer, etc., should, I think, be brought up in a separate communication, as it will probably be necessary to accompany it with a proposition statement.

No. 4, dated 11th April 1899.

*From—C. MICHIE SMITH, Esq., Government Astronomer, Solar Physics Observatory,
Kodaikanal,
To—The Meteorological Reporter to the Government of India.*

I HAVE the honour to lay before you the following matters connected with this observatory.

2. When the original estimates for the building here were drawn up, the rates given were so high that it was found necessary to cut everything down to the lowest possible amount in order that the total sum to be expended might be brought within the limits which the Government of India was prepared to expend. I all along maintained that these rates were excessive, and as a matter of fact they have proved to be so. At the present time the probable savings in carrying out the work are as follows in round figures:—

Astronomer's house	.	.	.	.	.	.	.	.	.	.	R	3,000
Assistant's house	.	.	.	.	.	.	.	.	.	.		2,000
Observatory	.	.	.	.	.	.	.	.	.	.		11,000

3. Under these circumstances I venture to point out that there are several directions in which farther expenditure is either absolutely necessary or at least highly desirable.

4. (a) Since the estimates were prepared my staff in Kodaikanal has been increased by the transference of one of the Assistants from Madras, but no house has been provided for him. A suitable house would cost about R2,000.

(b) It is found to be impracticable to mount the anemograph on the Observatory buildings, and a separate tower must be provided for this. The tower need only be about 20 feet high, but I cannot estimate the cost till the design has been settled.

(c) A small workshop for the mechanic is necessary. It would not cost more than R200 or R250.

(d) A small building for the transit instrument is also required. This was at first provided for in the plans for the main observatory building, but owing to structural difficulties it had to be left out. Probably R300 would cover the necessary expenditure.

(e) Book-cases and an office table are required for the library. These have been objected to by the Examiner of Public Works Accounts, because the library is in the Astronomer's house, but this seems to me to be a mistake, because the library was built of specially large size in order that it might be used as the Astronomer's office and the official library. In the original designs there was a separate office building with a library and office rooms, but to save expense this was given up and room made for the library in the Astronomer's house. *This matter is urgent.*

5. The above items may all be classed as necessities, those that follow though not absolutely necessary are at least desirable for comfort and appearance.

(f) No money has been provided for laying out the grounds about the house or observatory. This is a matter which need only be taken up gradually, but something should be done at once; especially I would like to plant a number of trees for shelter as all the houses except that of the 1st Assistant are much exposed, and it would be a pity to lose the season for planting. I would request permission to expend R1,000 during the present year in this and in laying out the ground, making paths, etc. The sum will, I trust, not be considered unreasonable when I mention that the observatory grounds cover more than 100 acres.

(g) The houses are absolutely unfurnished, not even mats being provided. Even in Madras mats are provided in all Government houses, and it seems to me rather a hardship that here where the expense of providing these things is much greater, my Assistants should have to provide them for themselves. I would suggest that permission might be given to place coir or split cane matting in at least two rooms of each of the Assistants' houses.

(h) Only the 1st Assistant's house has any out-houses attached, and I should like to have permission, if necessary, to erect one for each of the other houses, the cost will be small. Even

**PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, JULY, 1899.**

Additions required to complete observatory buildings at Kodaikanal. [Pros. No. 3

in the case of the Astronomer's house the out-house accommodation is very insufficient, but this is a less urgent matter at present.

6. With reference to the meteorological station at Periakulam it would be best to build a house for the Assistant in charge. The cost would be R1,500 to R2,000, and a site could probably be obtained in the cutcherry compound which is a very large one. The reason why I wish to have a house there is that the station is to be used as a relieving station for my Assistants here, and the town is a very insanitary one, and the part where houses can be hired is in a very filthy state with cholera almost always present. In any case it will probably be cheaper in the long run to build a house than to hire one, as I do not think a suitable house could be got for less than R15 per month (=9 per cent. on R2,000) and even then only at a considerable distance from the meteorological station.

7. In the original plan for the observatory, provision was made for an R. E. Sergeant on the staff, but this was given up because it was thought to be impracticable to get such a man without paying at least R300 per month. I now find that a retired Sergeant (not an R. E.) could be got on a salary of from R40 to R100 per mensem and a house, and that he would be able to take up the duties of Writer which at present carries a salary of R30—50. The great advantage of having a European to look after the buildings, the sanitation, etc., will be at once evident, while the amount of time that would be saved to the Government Astronomer if such a man were appointed would be worth far more than the difference between his pay and that of the Writer at present.

8. I do not propose that such an appointment should be made at once, since the Sergeant whom I have in view would not be available for some six months; but I bring the matter forward now so that it can be considered in connection with the new house that has to be built for an Assistant. It is evident, that if it is to be built so as to accommodate a European, the internal arrangements will have to be somewhat different from what they will be if it is built for an Indian. I may point out that for the current year the additional expense could probably be met without any increase of expenditure over the Budget Estimate for salaries.

9. The whole of the above proposals can be carried out at an expenditure of about half the amount which it is estimated will be saved on the buildings.

(i) I have left out for the present the question of a water supply for the observatory, as I am not prepared to submit definite plans. The Government Architect proposes placing a hydraulic ram on the Pambar stream, but in addition to the fact that this would cost at least R2,000, there are objections which I do not see how to overcome. I am at present making some experimental sinkings for wells, and if successful, a much less expensive plan can probably be devised.

No. 2.]

No. 1717—27-3, dated Simla, the 26th May 1899.

Serial No. 3.

From—The Secretary to the Government of India,

To—The Secretary to the Government of Madras.

I AM directed to forward a copy of a letter from the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 301 S., dated 19th April 1899, and enclosure, regarding the additions and extensions necessary for the completion of the Kodaikanal Observatory, and to enquire what the savings on the sanctioned estimate for the observatory buildings amount to.

No. 3.]

No. 1663 W., dated 26th June 1899.

Serial No. 4.

From—The Secretary to the Government of Madras, P. W. Dept.,

To—The Secretary to the Government of India.

I AM directed to acknowledge the receipt of your letter No. 1717—27-3, dated 26th May 1899, enquiring what the savings on the sanctioned estimates for the Observatory buildings at Kodaikanal will amount to, and in reply to state that the savings are estimated at R13,500 as shewn below:—

	R
(a) Observatory	7,000
(b) Astronomers' quarters	3,500
(c) Quarters for Assistants	3,000
TOTAL .	13,500

2. I am, however, to point out that wire fencing, carpets, and furniture which were not included in the original estimates have been provided and paid for under the sanction of the Government of India in the Public Works Department, communicated in its telegram, dated 24th February 1899, No. 027 C. W. -B. The above savings are exclusive of the cost of these articles.

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, JULY, 1899.

Pros. No. 3] Additions required to complete observatory buildings at Kodaikanal.

No. 2331—27-4, dated Simla, the 11th July 1899.

Endorsed by the DEPARTMENT OF REVENUE AND AGRICULTURE.

Serial Nos. 2, 3 and 4 forwarded to the Public Works Department with the request that the necessary orders may be issued at a very early date.

No. 4.] No. 713 C. W.—B., dated Simla, the 13th July 1899.

Serial No. 5.

Endorsed by the PUBLIC WORKS DEPARTMENT.

THE following is forwarded to the Revenue and Agricultural Department for information, with reference to that Department's Memorandum No. 2331—27-4, dated the 11th July 1899.

No. 713 C. W.—B., dated 13th July 1899.

From—The Secretary to the Government of India, PUBLIC WORKS DEPARTMENT,

To—The Secretary to the Government of Madras, Public Works Department.

WITH reference to your letter No. 1663 W., dated the 26th June 1899, to the address of the Government of India in the Department of Revenue and Agriculture, intimating that the savings on the sanctioned estimates for the observatory buildings at Kodaikanal are estimated at Rs. 500, I am directed to communicate the sanction of the Government of India to the following additional works which are considered desirable for the completion of the observatory buildings, being carried out and charged against those savings :—

1. Erection of a small workshop for the Mechanic.
 2. Erection of a building for the transit instrument.
 3. Book cases.
 4. Laying out the grounds of the observatory.
 5. Mats for the Assistants' houses.
 6. Additional out-houses.
 7. Observatory shed and observer's house at Periakulam.
2. I am to request that the estimated cost of these additions may be reported.

No. 2437—27-5, dated Simla, the 19th July 1899.

Endorsed by the DEPARTMENT OF REVENUE AND AGRICULTURE.

COPY forwarded to the Meteorological Reporter to the Government of India and Director General of Indian Observatories for information, with reference to his letter No. 301 S., dated 19th April 1899.

GOVERNMENT OF INDIA.

PROCEEDINGS

OF

THE DEPARTMENT OF REVENUE AND AGRICULTURE

FOR

AUGUST, 1899.

METEOROLOGY.

LEASE OF THE HOUSE NO. 4, CAMAC STREET, FOR THE ACCOMMODATION OF
THE BENGAL METEOROLOGICAL OFFICE.

No. 1.] No. 2484 (Agri.), dated Calcutta, the 28th July 1899.

From—F. A. SLACK, Esq., C.S., Officiating Secretary to the Government of Bengal,
Revenue Department,

File No. 22 of
1899.
Serial No. 5.

To—The Secretary to the Government of India.

IN continuation of my letter No. 680 T.R., dated the 26th June 1899, and subsequent correspondence, regarding the renting of a house for the Bengal Meteorological Office, I am directed to state, for the information of the Government of India, that all the suitable houses in Theatre Road were taken up before this Government could secure one. Consequently Mr. Little, the Meteorological Reporter to this Government, has taken the house No. 4, Camac Street, which, it is stated, will afford the requisite accommodation. The rent demanded for this house is R400 per mensem, on a lease for not less than five years. It is on these terms which were the most favourable that could be obtained, and on condition that the premises will be occupied from the 1st of October next, that Mr. Little has taken the house. The Lieutenant-Governor recommends for the approval of the Government of India the arrangement detailed above. It is to be understood that Mr. Little is responsible during the period of the lease for any rent in excess of R300 per mensem.

2. I am to add that this Government has not yet been able to find for a reasonable price a suitable site for the erection of a building for the Bengal Meteorological Office in the business part of the town.

No. 2.] No. 2902—22-6, dated Simla, the 25th August 1899.

Serial No. 6.

From—E. MACONOCHE, Esq., Under-Secretary to the Government of India,

To—The Secretary to the Government of Bengal, Revenue Department.

WITH reference to your letter No. 2484 (Agri.), dated 28th July 1899, I am directed to inform you that the Government of India have no objection to the proposal of the Government of Bengal to locate the Bengal Meteorological Reporter and his office in the house No. 4, Camac Street, rented at R400 per mensem, for a period of not less than five years from 1st October 1899. The charge on account of such portion of the rent as is chargeable to Government will be met from the budget of the Meteorological Department (Imperial Revenues).

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, AUGUST, 1899.

Pros. No. 2] Lease of house No. 4, Camac Street, for Bengal Meteorological Office.

2. As regards the question of the rent to be paid by the Bengal Meteorological Reporter for occupying a portion of the house, I am directed to forward

Letter from the Meteorological Reporter to the Government of India, No. 452 S., dated 2nd September 1889.

Letter to the Meteorological Reporter to the Government of India, No. 151, dated 17th September 1889.

a copy of the letters noted in the margin, from which it will be seen that the free accommodation provided for the Reporter is limited to the equivalent of an allowance of R50 a month. The portion of the

rent of R400 a month which is assessable on the quarters (including stabling and servants' quarters) actually occupied, or set apart for occupation, by the Reporter and his family in No. 4, Camac Street, should be assessed by the Public Works Department, and the Reporter should be required to pay the sum assessed by that Department less R50 a month.

No. 2903—22-6.

COPY of the correspondence forwarded to the Finance Department for information.

No. 2904—22-6.

COPY of the correspondence forwarded to the Meteorological Reporter to the Government of India and Director General of Indian Observatories for information in continuation of letter No. 2565—55-16, dated 22nd September 1898.

GOVERNMENT OF INDIA.

PROCEEDINGS

OF

THE DEPARTMENT OF REVENUE AND AGRICULTURE

FOR

SEPTEMBER, 1899.

METEOROLOGY.

ESTABLISHMENT OF AN OBSERVATORY AT VELLORE.

No. 1.] No. 568 S., dated Simla, the 1st October 1898.

From—JOHN ELIOT, Esq., Meteorological Reporter to the Government of India,

To—The Secretary to the Government of India.

File No. 56 of
1898.

Serial No. 1.

I HAVE the honour to forward a letter from the Government of Madras asking for permission to establish an observatory at Vellore in order to supply data of an area not represented by the present system of stations in Madras for inclusion in the Daily Weather Report. The Local Government are prepared to erect the shed and to make a contribution to this Department to meet the pay of the observer and also apparently for the cost of the Daily Weather Telegrams to Madras.

2. As the observatory is required in order to supply information to the Government of Madras, and as it is an important station for the local daily weather report, it would be advisable to sanction its establishment under the conditions proposed by the Government of Madras.

3. When observatories are established at the instance of the Local Governments, it is usual for the Meteorological Department to supply instruments free of cost to the Government concerned, and I have the honour to suggest that the practice be adhered to in the present instance, and that I may be authorized to supply a complete set of meteorological instruments.

4. The cost of maintaining the observatory should be treated as a provincial contribution to the budget grant of the Meteorological Department, and the Madras Government be advised to place the amount required each year to the credit of the Department in the usual manner.

(ENCLOSURES.)

Extract from the Proceedings of the Board of Revenue, Madras,—No. 4043 Misc., dated the 4th July 1898.

RESOLUTION.—In communicating G. O. No. 163 Rev., dated 28th October 1896, the Board requested the Meteorological Reporter to Government to submit proposals for establishing an observatory at Vellore and in B. P. 6713, dated 18th December 1896, she was requested to visit Vellore and submit definite proposals. Miss Pogson paid a visits to Vellore in January 1897, but no definite report has yet been received from her. She is now requested to submit the report called for at once, and to give such an explanation for the delay as the Board can submit to Government.

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, SEPT., 1899.

Pros. No. 1]

Establishment of an Observatory at Vellore.

Extract from the Proceedings of the Board of Revenue, Madras,—No. 5363 Misc., dated the 7th September 1898.

READ again—

• Copy attached.

B. P. No. 4043, * dated 4th July 1898.

Read also the following :—

Letter from Miss E. Isis Pogson, F. R. Met. Soc., Meteorological Reporter to the Government of Madras, No. 661, dated 26th August 1898.

In accordance with Proceedings of the Board of Revenue (Revenue Settlement, Land Records and Agriculture), dated 18th December 1896, No. 6713 Misc., I have the honour to submit herewith the detailed scheme for the establishment of an observatory at Vellore, for submission on approval, to the Meteorological Reporter to the Government of India, agreeably to the request in the last paragraph of his letter No. 86 S., dated 2nd February 1897.

Having first obtained permission from the Postmaster General, Madras, to place the Vellore Meteorological Observatory at the Postal and Telegraph Office and to utilize the service of the Post and Telegraph Master as Local Superintendent and Observer, if necessary, I proceeded to Vellore on the 27th of January 1897 to select a site and make the necessary preliminary arrangements.

After driving round and taking a general view of the place myself and consulting the Executive Engineer of the District, we agreed that the best and most convenient site available for the erection of the Thermometer shed and instruments was the Esplanade in front of the Post and Telegraph Office, a large open piece of ground, measuring 450 feet by 300 feet and well under the observation of the Post and Telegraph Office employés. There are two nice large rooms in the Telegraph Office fairly well lighted, in either of which the Post and Telegraph Master said the barometer might be placed. Being a building of two stories, the roof of the Postal and Telegraph Office offers a fairly good exposure for the Anemometer and Wind Vane. All the public offices at Vellore are, however, situated in the Fort surrounded by a high wall, which is rather objectionable.

The Post and Telegraph Master was most anxious to undertake the combined charge of the Observatory and the Observership on condition that he might be given the necessary instructions by the Madras Meteorological Office, at the Vellore Observatory : as in accordance with previous information from the Postmaster General, he could not be allowed to vacate his post to undergo the usual practice at the Madras Meteorological Office. I would therefore suggest the erection of the usual pattern of Thermometer shed similar to all the rest in the Madras Presidency on the Esplanade in front of the Post and Telegraph Office, and that it may be placed in charge of the Post and Telegraph Master, who will also take the observations. The observatory need only be a third class one, recording observations at 8 A.M. only, which should immediately be wired to the Madras Meteorological Office for incorporation in the Madras Daily Weather Report in the line already allotted for that purpose. The Executive Engineer of the Vellore District might be asked to have the Thermometer shed made and erected exactly in accordance with the Madras Presidency pattern, a copy of which is forwarded herewith, and he would also have the Anemometer and Wind Vane properly fixed on the roof of the Post and Telegraph Office building. The Anemometer will probably require a small platform and step ladder to enable the observer to reach it at times of observation and for oiling and cleaning. The necessary instruments for the equipment of the observatory will on application be supplied from the Imperial Meteorological Office, Calcutta, and on receipt of these, I will depute my Head Clerk in charge of them to Vellore, to place them in their proper positions and also to give the Post and Telegraph Master, or whoever is to take the observations, the necessary instructions in reading

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, SEPT, 1899.

Establishment of an Observatory at Vellore.

[Pros. No. 1

the instruments, making out the Weather Telegrams, etc., which will probably take him about ten days. As soon as this is all done, I will, with the permission of Government, go to Vellore myself to see that everything is satisfactory on the starting of the work. The initial expenditure may roughly be estimated as follows :—

	R
Cost of Thermometer shed of Madras pattern	175
Its carriage to Vellore and erection	50
Travelling expenses of Head Clerk to teach observer	36
Ditto Meteorological Reporter and Duffadar to Vellore	36
Erection of Anemometer ladder staging and Wind Vane	50
	347

Annual Expenditure.

	R
Pay of observer at R10 per mensem	120
Cost of telegrams at R1 per diem	365
Contingent expenses per annum including postage, etc.	10
	495

The initial expenditure estimated above is only approximate and according to the cost of Thermometer sheds made of good teakwood under the supervision of the Meteorological Office, which have generally lasted upwards of 20 years or more.

A plan of the Vellore Fort, showing the Post Office and other offices, kindly furnished by the Executive Engineer of the District, is forwarded herewith, showing the proposed position of the Thermometer shed in red ink on the Esplanade. A view and plan of the Thermometer shed showing the arrangement of the instruments are also annexed to these proposals.

In conclusion, I beg to suggest that the Meteorological Reporter to the Government of India may have the necessary funds transferred to his budget, both for the initial and annual expenditure, on receipt of which, he will, I am sure, forward the required instruments and take the necessary action in asking the Executive Engineer of the District to erect a Thermometer shed and authorizing me to see to all other requirements.

RESOLUTION.—Submitted for the orders of Government, with reference to its memorandum No. 163, dated 28th October 1896, through the Meteorological Reporter to the Government of India, with reference to his letter No. 86 S., dated 2nd February 1897.

2. After a delay of nearly two years, Miss Pogson reports that she selected a suitable site for erecting a shed for a third class station in front of the Post and Telegraph Office at Vellore, when she visited that place in January 1897. The selection may be approved, and orders may be issued in the Public Works Department for the erection of the shed on the site selected. The approximate cost is put at R275 by Miss Pogson.

3. The report read above is silent as to the probable cost of the necessary instruments and of forwarding them to Vellore. The Meteorological Reporter to the Government of India may be asked to provide these and to arrange with the Telegraph Department for the transmission of daily weather telegrams from the station as soon as it is in working order.

4. Sanction will be requested for the grant of a special allowance to the Post and Telegraph Master of R10 per mensem for taking charge of the observatory, and to the payment of travelling allowances under the usual rules to the Meteorological Reporter and her Head Clerk in connection with the starting of the observatory.

*The Plans of the proposed observatory.
(Not produced in Proceedings.)*

No. 2.]

No. 1624—56-2, dated Simla, the 20th May 1899.

**File No. 56 of
1898.**

From—E. MACONOCHE, Esq., Under Secretary to the Government of India,

To—The Secretary to the Government of Madras.

Serial No. 2.

I am directed to forward a copy of a letter from the Meteorological Reporter to the Government of India and Director General of Indian Observatories, No. 568-S., dated 1st October 1898, with which he submitted a copy of the Proceedings of the Board of Revenue, Madras, No. 5363-M., dated 7th September 1898, containing proposals for the establishment of an observatory at Vellore and to enquire whether the Governor in Council accepts the Board's proposals.

No. 3.]

No. 529, dated Ootacamund, the 8th August 1898.

Serial No. 3.

From—J. H. A. TREMENHEERE, Esq., I.C.S., Acting Secretary to the Government of Madras,

To—The Secretary to the Government of India, Revenue and Agricultural Department.

I am directed to acknowledge the receipt of Mr. Maconochie's letter No. 1624—56-2, dated 20th May 1899, forwarding certain correspondence relative to the establishment of an observatory at Vellore. In reply I am to say that His Excellency the Governor in Council is willing to accept Miss Pogson's proposals in the matter, as detailed in her letter to the Board of Revenue, Madras, No. 661, dated 26th August 1898. The shed for the observatory will be erected at the cost of Provincial funds and an annual contribution will be made to the Meteorological Department on account of the allowances to be paid to the observer. As regards the cost of the transmission of the daily weather telegrams from the station to Madras, I am to request reference to paragraph 1 of letter from the Government of India, (Revenue and Agricultural Department) No. 2600-20, dated 1st August 1898, in which sanction has been accorded to the supply, free of charge, of the necessary telegraphic information required for the publication of the Madras daily weather report and to express the hope that, as the observatory at Vellore is required in order to supply data for an area not represented in the present system of stations in Madras, the Government of India will be pleased to extend the exemption to the case of daily weather telegrams from this station also.

2. It is presumed that a complete set of meteorological instruments required for the observatory will be supplied by the Meteorological Department free of charge.

No. 4.]

No. 2982—56-4.

Serial No. 4.

FROM

E. MACONCHIE, Esq., I.C.S.,
Under-Secretary to the Government of India,

TO

THE METEOROLOGICAL REPORTER TO THE
 GOVERNMENT OF INDIA AND DIRECTOR
 GENERAL OF INDIAN OBSERVATORIES.

Dept. of Rev. & Agri.
Meteorology.

Simla, the 1st September 1899.

SIR, .

WITH reference to your letter No. 568-S., dated 1st October 1898, I am directed to convey the sanction of the Government of India to the establishment of an observatory at Vellore and to request that you will supply, free of charge, a complete set of Meteorological instruments required for the Observatory. The cost of erecting the shed for the observatory and any expenditure coming under the category of public works should be met from Provincial revenues, while the allowances of the observer and other recurring annual expenditure as well as the charges on account of the cost of the daily weather telegrams from Vellore to Madras should be met by the Meteorological Department (Imperial revenues).

2. I am to add that the pay of the observer and any other charges which may be incurred during the current official year after the establishment of the observatory should be met by reappropriation from the budget grants of your Department for 1899-1900.

I have the honour to be,

SIR,

Your most obedient servant,

E. MACONCHIE,

Under-Secretary to the Government of India.

No. 2983—56-4.

Copy forwarded to the Government of Madras for information with reference to their letter No. 529, dated 18th August 1899.

No. 2984—56-4.

Letter from the Meteorological Reporter to the Government of India, No. 568-S., dated 1st October 1898.

Letter to the Government of Madras, No. 1624—56-2, dated 20th May 1899.

Letter from the Government of Madras, No. 529, dated 18th August 1899.

Copy of the correspondence forwarded to the Finance Department for information.

By order,

E. MACONCHIE,

Under-Secretary to the Govt. of India.

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, SEPT., 1899.

Adoption of a standard time for all India.

[Pros. No. 5

ADOPTION OF A STANDARD TIME FOR ALL INDIA.

File No. 66 of
1898.
Serial No. 1.

File No. 66 of
1898.

Serial No. 1.

DIARY No. 3103.

India Office,
London, 10th November 1898.

Revenue,
No. 204.

To His Excellency The Right Honourable The Governor
General of India in Council.

MY LORD,

Standard Time for all India.

* Letter from the Royal Scottish Geographical Society, dated 7th June 1898, with enclosure.

† Letter from the Royal Geographical Society, dated 22nd October 1898, with enclosure.

I forward, for the consideration of your Excellency's Government, a proposal* from the Royal Scottish Geographical Society that a standard time of (say) five hours in advance of Greenwich time should be established for all India. The Royal Geographical Society of London, whom I consulted, agree in advocating† the adoption of a standard time for all India; but they consider that $5\frac{1}{2}$ hours before Greenwich time would be more generally suitable than five hours.

I have the honour to be,

MY LORD,

Your Lordship's most obedient humble Servant,

GEORGE HAMILTON.

ENCLOSURES.

No. 1.

Royal Scottish Geographical Society,

Queen Street, Edinburgh,

Sir,

7th June 1898.

I am desired by the Council of this Society to submit, for the favourable consideration of the Secretary of State for India, the accompanying memorandum on the desirability of establishing a general "Standard Time." The Council are of opinion that important advantages would result from the suggested modification of existing practice in regard to the keeping of time in Ireland, and in countries, especially British Colonies and Dependencies, where such a standard has not yet been introduced.

I have, &c.,

FRED. BAILEY,

Secretary.

The Under Secretary of State

for India.

Enclosure in No. 1.

Royal Scottish Geographical Society.

Notes on Standard Time.

In these days of rapid travel and incessant interchange of telegraphic news between distant parts of the world, the desirability of establishing a general "Standard Time" has become more and more apparent. By the term standard time is to be understood the adoption of a limited number of mean times referred to a common meridian, and differing from each other, wherever practicable, by a whole number of hours. The following countries have already adopted such standard times referred to the meridian of Greenwich:—

Great Britain, Belgium, Netherlands, and Portugal use Greenwich mean time.

Norway, Sweden, Denmark Germany, Austria-Hungary, Switzerland Italy, and Malta use Mid-European time, or 1^h East.

Cape Colony uses the standard meridian of 1½^h East.

Natal uses the standard meridian of 2^h East.

Japan uses the standard meridian of 9^h East.

United States and Canada use—

Intercolonial time, or 4^h West.

Eastern time, or 5^h West.

Central time, or 6^h West.

Mountain time, or 7^h West.

Pacific time, or 8^h West.

West Australia has adopted the standard of 8^h East.

South Australia has adopted the standard of 9^h East.

Victoria, New South Wales, Queensland, and Tasmania use 10^h East.

New Zealand uses 11½^h East.

On looking over this list, one cannot suppress a feeling of regret that the half hour in the standard time of Cape Colony has not been avoided by conforming to the time adopted in Natal. Even in New Zealand, it is questionable whether it would not have been better to have taken 11^h as the standard. 12^h would be objectionable, as it would introduce a possible uncertainty as to the day of the month.

From a copy of the Admiralty *List of Time Signals*, 4th edition, 1895, with MS. additions up to 25th August 1897, obligingly supplied by the Hydrographic Department, it seems that time is officially distributed for the use of seamen at 153 stations scattered over the globe. At 94 of these stations the signals are given in Greenwich mean time, with the possible addition of hours or half-hours, exactly as in the case of standard time. At the remaining 59 stations, the time is referred to some other meridian, local mean time being adopted in the majority of cases. Of these 59 stations, at which the signals do not conform to Greenwich time, 21 are situated in British possessions, where the inconvenience due to divergence from prevailing usage must make itself all the more felt. At several of them, however, the corrections required to bring local time into accord with the general system are so small that the change would be scarcely felt in everyday life. Thus a correction of $+ 9^m 47^s.6$ would reduce Mauritius mean time to that of 4^h East of Greenwich; and— $7^m 20^s.5$ at Demerara, $+ 6^m 2^s.5$ at Trinidad, $+ 4^m 0^s.0$ at St^a Lucia, and $+ 19^m 18^s.3$ at Bermuda, would enable these four possessions to make common use of intercolonial time, or 4^h West, which could also be extended to Newfoundland with advantage. Indeed, it is to be hoped that all British stations will adopt the nearest hour of Greenwich time as their standard. In India great discomfort was experienced until Madras time was recognised on all the railways. In Bombay, however, the continued use of local time, half an hour behind railway time, is frequently the source of vexatious mistakes. The best way out of the difficulty would seem to be to use standard time of 5^h East for the whole country and for all purposes. There need be no inconvenience in regulating the routine of daily life by standard time in a country extending over 30° in longitude, it being only necessary to make the hours for business, school attendance, meals, &c., somewhat earlier in the eastern parts of the country, and correspondingly later in the western parts. For instance, supposing that the use of Greenwich time became general in Ireland, instead of being restricted, as at present, to the telegraphic offices, the nominal hour, for starting work, &c., would have to be half an hour (or, to be perfectly exact $25^m 21^s.1$) later, in order to retain the original customary time of the day.

In this connection, it may be remarked that wherever standard time has been introduced, the public have quickly learnt to appreciate the advantages and comfort of the change from the old system.

In closing these short notes it is most satisfactory to add that the French Chamber of Deputies, acting in a spirit worthy of the nation who gave the metrical system to the world, have decreed that the national time in France shall be that of the meridian of Paris, less $9^m 21^s$, thus bringing French time into agreement with standard time.

Queen Street, Edinburgh,
7th June 1898.

No. 2.

1, Savile Row, Burlington Gardens, W.,

Sir,

22nd October 1898.

In accordance with the request contained in your letter of June 16th, that Lord George Hamilton might be favoured with the views of the Royal Geographical Society on the subject of a "Standard Time" for all India, I am desired by the Council to forward the accompanying memorandum, which, it is hoped, will be considered satisfactory.

I am, &c.,

The Under Secretary of State
for India.

J. SCOTT KETTIE.

Enclosure in No. 2.

Notes from the Council of the Royal Geographical Society on the subject of a "Standard Time" for all India.

1. The question of adopting a standard for time reckoning in British India, based on Greenwich time, has more than once been raised already, but with no practical result. The need of a general standard for the whole country became apparent when railways and telegraphs were introduced, and led to the adoption of Madras time as the standard, and this is now in general use, though local time has not wholly been set aside.

2. Madras is 5 hrs. 21 min. East of Greenwich, and it was originally accepted as the standard from which time should be reckoned, as it was nearly half way, in longitude, between Calcutta and Bombay, the former being 5 hrs. 54 min. and the latter 4 hrs. 52 min. East of Greenwich. It was proposed to the Government of India some years ago to adopt for Indian standard time a meridian differing from that of Greenwich by an *even number of minutes*, but from some extraordinary misconception on the part of their advisers as to the manner of ascertaining time, this was objected to as likely to cause inconvenience in regulating time signals. It need hardly be said that whatever standard be adopted, local time could be accurately converted to that standard at any observatory, the longitude of which is known, and that specific reference to Madras was wholly unnecessary.

3. Although, where circumstances admit of it, preference may rightly be given to the adoption of time standards differing by integral hours from that of Greenwich, yet as the object is to secure public convenience by the introduction of simplicity and uniformity in the method of time reckoning, it would be a serious mistake to attempt to enforce any arbitrary uniformity of system that failed to comply with the essential condition of practical convenience. In the nature of the case, the adoption of a uniform time standard over an extended area involves the acceptance of a greater or less amount of error, and in any plan decided on there must be some compromise.

4. Inspection of the map of India will show that the meridian of 5 hrs. 30 min. East of Greenwich fairly divides the whole area to be covered into two equal parts. The extreme error that would be introduced on the East, at the head of the Assam Valley and in Burmah, would be 60 minutes, and on the West, at Kurrachee, one or two minutes more.

5. Though this amount of error is somewhat large, it is very doubtful whether it would not, for practical purposes, be more convenient than to accept two or more different time standards involving less error.

6. The small change from the meridian of Madras (the present standard for railway time) to that of 5 hrs. 30 min. East of Greenwich would make no sensible change in the existing time arrangements in force on Indian railways, which have been attended by no inconvenience whatever in practice.

7. A very little examination will show that any attempt to introduce a system in which there should be less local error, would involve abrupt changes of time on many lines of railway that would be seriously inconvenient to the travelling public. The substitution of the meridian of 5 hrs. East for that of Madras, would make a change for the worse over a considerably larger area than that in which the change would be beneficial.

8. The only provinces in which a meridian different from that which would be most generally suitable could be adopted without such inconvenience, would be Burmah and perhaps Assam, for which the meridian of 6 hrs. 30 min. East would be more suitable; the break taking place along the meridian of 6 hrs. 0 min. East, which nearly follows the line of the River Brahmaputra in that part of its course which separates Bengal from Assam and Cachar. A change in the standard would be of smaller importance in these cases, as communication between India proper and Burmah is at present wholly carried on by sea,

and the break at the Brahmaputra also involves a complete dissociation of railway communication. It seems, however, doubtful whether it might not be better for the sake of uniformity to accept the meridian of 5 hrs. 30 min. in these provinces also.

9. On the whole the small change above suggested, from the meridian of Madras to that of 5 hrs. 30 min. East, would appear best to meet the general convenience of the provinces of British India, and at the same time to comply sufficiently with the real requirements of a scientific system of uniform time reckoning.

10. It may not be out of place to add that by giving legislative authority to such a system of standard time as is proposed, all inconvenient doubts as to the true dates of births, marriages, or deaths, as well as of commercial transactions, would be avoided. These may readily arise in a country in which the discrepancies of local time at various places must often be very considerable, and the expediency of passing a law to obviate them is worthy of consideration by the Indian Government.

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, SEPT. 1899.

Adoption of a standard time for all India.

[Pros. No. 6]

No. 6.]

No. O.-477, dated Calcutta, the 22nd May 1899.

Serial No. 2.

From—MAJOR A. ALCOCK, I.M.S., Honorary Secretary, Asiatic Society of Bengal,
To—The Private Secretary to H. E. the Viceroy and Governor General of India.

I AM directed by the President and Council of the Asiatic Society of Bengal to request that you will be good enough to lay before His Excellency the Governor General, as Patron of the Society, their views regarding the feasibility and desirability of the introduction of a standard time for universal use throughout the Indian Empire.

2. The subject was brought before the Society by Mr. R. D. Oldham at their monthly meeting held on 5th April 1899, and on the motion of Mr. T. H. Holland seconded by Major D. Prain, I.M.S., the meeting decided by 19 votes to 1 to refer Mr. Oldham's proposal to the Council for any further action they might consider necessary. A copy of the Proceedings of the meeting of the Society held on 5th April, containing the text of Mr. Oldham's note and of the resolution adopted by the meeting is enclosed for His Excellency's information.

3. In accordance with the resolution adopted at the meeting of the Society the subject was considered by the Council at their next ensuing meeting, held on 28th April, 1899, when it was unanimously decided that the views of the Council should be submitted to His Excellency's favourable consideration.

4. The Council of the Society are unanimous as to the desirability of introducing a standard time into general use in India, and are also of opinion that the preliminary enquiries which must be made before the feasibility of the introduction of a standard time can be determined, or the selection of the standard for adoption be made, can most advantageously and authoritatively be carried out by the Government of India; from whom too the administrative action necessary for the introduction of any change for the present system must come.

5. Apart from the general inconvenience of the present system of local times the Council are desirous of pointing out, as a matter with which they are especially concerned, the hindrance to exact scientific observation which it entails. Local time, away from the principal sea-ports, is obtained by an allowance of a certain number of whole minutes in addition to, or subtraction from, the daily time signal transmitted, at 4 P.M. Madras time, through the telegraph system. The number of minutes to be added or subtracted is printed in the official "Telegraph Guide" and is presumably intended to be the nearest whole minute to the actual difference in time. This intention is not always fulfilled; for instance Calcutta time, which is conventionally and in accordance with the official "Telegraph Guide" 33 minutes fast of Madras time is actually 32 minutes and 20 seconds fast, so that 32 minutes would be a more correct allowance to make than 33. Moreover, the officially announced allowance is in some cases greater and in others less than the actual true difference in time, thereby introducing a further source of error. Added to these it is not uncommon for small towns to use neither Madras nor their own local time, but the local time of the nearest large city. The Council of the Society is not aware whether this practice prevails in other provinces, but know that not a few places in Bengal habitually use Calcutta time and not that of Madras or of their own meridian.

6. This want of uniformity of time is a cause of great difficulty and confusion in all researches where it is necessary to compare a recorded time at one place with that at another, and may nullify or vitiate even the most carefully made observations. For this reason and apart from any considerations of general convenience the Council of the Society are desirous of seeing the universal adoption of a single standard time in India, and the abandonment of the use of local times.

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, SEPT. 1899.

ros. No. 6.]

Adoption of a standard time for all Indian.

7. The Council of the Asiatic Society is aware that there is already in existence a nominal standard of time for all India, in that of the Madras Observatory, and that this time is actually in use on all railways, and, formally, by the Telegraph Department. They are also aware that many towns habitually use Madras or railway time in preference to their own local time, but at present there is no uniformity of practice in this matter, and they are further of opinion that the present chaotic method of time-keeping has largely been perpetuated by the printing in the official "Telegraph Guide" of the differences between local and Madras time. By the omission of this information they consider that one standard time at all places would soon follow. They are not however of opinion that the practice has been altogether productive of evil, and if the postponement of the adoption of a standard time should lead to the adoption of a more convenient standard than that of Madras, the delay will even have been advantageous.

8. Before deciding on the universal introduction of a standard time it would, in the opinion of the Council of the Asiatic Society, be advisable to consider whether the use of only one time for the whole of India is practicable. The local times at the extreme east and west extremities of the telegraph system, as it stands, amounts to 2 hours and 10 minutes; when extended to the extreme limits of the Empire, it will reach nearly 3 hours. In these circumstances it seems doubtful whether the adoption of one time throughout would not be accompanied by so great an inconvenience that it would not come into universal use. In this case the adoption of standard time could only be enforced if it were accompanied by the introduction of the hour-zone system, by which there would be two or three different times in use, each differing by exactly one entire hour, the minute and second being everywhere the same and the hour also in each separate hour-zone.

9. This system of hour-zones is consistent with the use of Madras or any other time as a standard, but concurrently with the consideration of the desirability of adopting it, the standard to be used should be considered, and it is the opinion of the Council of the Asiatic Society that there is much to be said in favour of the adoption of the system in its entirety, of abandoning the use of Madras or any Indian time as the standard, and adopting Greenwich time in its place. In this way civil time in India would be brought into direct relation with civil time in Europe, in the United States of America, and in the British Colonies in America, Africa and Australia; the difference in time would be always a number of whole hours, or half hours, instead of, as at present, a number of hours and minutes which varies from place to place.

10. So far as inland towns are concerned the Council of the Asiatic Society does not anticipate that there would be any difficulty in introducing the use of whatever standard time may be decided on. The cessation of the publication of the difference between local and standard time, and the use of standard time in all Government offices and on public clocks controlled by Government, would probably be sufficient, but the principal seaport towns are differently situated and the necessity for considering their special needs will probably be the controlling factor in the decision finally arrived at.

11. At Calcutta, Bombay and Madras there are at present astronomical observatories part of whose duties is to control a daily time signal, established primarily for the use of the shipmasters in the port, to enable them to determine the error of, and to rate, their chronometers. Incidentally this time signal controls and determines the civil time in use in each of these towns and it seems improbable that a standard time, different to that given by the daily time signal, will ever come into general use in those ports. Any proposal to alter the time signals at other ports to Madras time would probably meet with strenuous opposition, and would be accompanied by no advantage to masters of ships lying in the port. A proposal to alter the time signals to an integral number of hours fast of Greenwich time would probably meet with

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much less opposition and would, in the opinion of the Council of the Society, be to the advantage of the shipmasters for whose benefit these time signals are primarily intended.

12. While unanimously of opinion that the general adoption of a standard time is desirable both on the grounds of public convenience and for the purposes of all scientific investigations involving a comparison of observed times at different places, the Council of the Society has no desire to express a decided opinion as to the standard to be adopted. While favouring Greenwich time for the reasons given in this letter, and because it appears likely to become the standard for the whole, as it already is for the larger part, of the civilised world, they recognise that such a change should only be introduced after careful inquiry and consideration of all the interests involved in the change. It is with a full trust in the enlightenment of the Government of India, in its willingness to undertake the necessary enquiries and its ability to adopt the course of action which will be most conducive to the general convenience of the Empire at large and to the advancement of science, and of the art of exact time-keeping, that the Council of the Asiatic Society have instructed me to lay their views before His Excellency the Governor General, in the hope that he will be pleased to regard them favourably and to take such steps as he may consider advisable to forward the introduction of the reform which they regard as desirable, if after full enquiry it should prove practicable.

Extract from the Proceedings of the Asiatic Society of Bengal, for April 1899.

On Time in India: a suggestion for its improvement.—By R. D. Oldham, F. G. S., Superintendent, Geological Survey of India.

In his anniversary address our President reminded us that the magnificent collections and additions to the knowledge of the deep-sea Fauna of the Indian seas, which have been made through the agency of the Indian Marine Survey, are due to the initiative of this Society. To-night I desire to lay before you a proposition that we shall once more take the initiative, this time in introducing a far-reaching but attainable reform, I mean the universal adoption of a standard time in India, and the abolition of the present barbarous arrangement, unworthy of a country pretending to civilisation, by which every place keeps its own time.

In former days, when means of communication were slow and difficult, and there was no means of maintaining a standard time, it was natural that each place should adopt its own local time, usually obtained from a sun dial, as often as not constructed for a different latitude and inaccurately adjusted to the meridian. Now that the whole country has been opened up by railways and telegraphs, and travel is not only easy but largely indulged in, the system has become anomalous by which a traveller from one town to another, who wishes to keep an appointment in the town he has come to, must first find out how many minutes the local time is fast or slow of that which he has brought with him, and must then either work out a sum in arithmetic or alter his watch.

To a certain extent a standard time has been adopted in India, for the railways universally use Madras mean time. This is also adopted by the Telegraph Department, but the effect is nullified by the printing, in the Official Telegraph Guide, of a table, covering 44 pages, which gives the number of minutes that the local time is fast or slow of Madras time. The result is a direct encouragement to the maintenance of the present inconvenient and antiquated system, and a hindrance to the adoption of a more rational one.

Some years ago an attempt was made to introduce Madras time as the standard for ordinary use in Bombay, but it met with so much opposition that it had to be abandoned. This opposition, though logically unjustifiable, was based on motives ingrained in human nature. The Bombay office man, told to come to office at half-past nine, instead of ten, felt himself defrauded of half an hour's leisure, just as the Calcutta office man would feel it a grievance if he was told to stop till half-past five, instead of being allowed to

depart at five, and this though each gained at one end what he lost at the other. So too through all the arrangements of domestic life a nominal change of time would at first produce a feeling of strangeness, which would, however, soon wear off and the change would be recognised as purely nominal, not real.

A more potent cause of resistance to the general adoption of the present standard time lies in the fact that it is Madras time. The citizen of Bombay, proud of being '*primus in Indis*,' and of Calcutta, equally proud of his city being the Capital of India, and—for a part of the year—the Seat of the Supreme Government, alike look down on Madras, and refuse to change the time they are using for that of what they regard as a benighted Presidency; while Madras, having for long given the standard time to the rest of India, would resist the adoption of any other Indian standard in its place.

All these local jealousies would disappear if the standard adopted was that of Greenwich, which is not only the prime meridian for nearly the whole of the civilised world, but gives the standard time to the greater part of four continents.

The adoption of a single standard for all India, whatever it might be, would, however, cause some inconvenience on account of the extent of the Empire from east to west. Extending over more than 30° of longitude the difference between local and standard time would, at some places, exceed an hour, and though a small difference between the nominal and real time of a place is of no importance, it becomes a source of inconvenience when the difference is great.

This difficulty can be simply and effectually met by adopting the system, in use throughout Europe and North America, of what are known as hour-zones. On this system the land is divided into belts running north and south, each 15° of longitude in width, and over each belt the same time is used, while in the belts to the east and west a change of a whole hour forwards or backwards is made. The standard adopted is Greenwich mean time, and wherever the system has been adopted all watches and clocks show the same minute, the only difference being in the hour.

But, as a strict adherence to this system would lead to practical inconvenience, since it would be constantly necessary to consult a map to find the exact longitude of a place, a compromise has been adopted, and the boundaries of the hour-zones are made to follow the principal political boundaries. In Europe, for instance, three times are recognised; East European time, exactly two hours fast of Greenwich, Mid-European, one hour fast of Greenwich, and West European, or Greenwich time. Mid-European time is used by Italy, Switzerland, Austria, Germany, Holland, Denmark and Norway and Sweden. Throughout these countries the traveller has no trouble about time, his watch needs no alteration, nor has he to do any sums of addition or subtraction. If he goes east of these countries the only change he has to remember is one of exactly an hour fast, a correction which can be easily remembered and automatically made without any proficiency in mental arithmetic. If he goes westwards, to England, he has only to make a similar correction of an entire hour, but in the opposite direction, to obtain Greenwich time.

In France this has not yet been adopted as the standard, and a change of some minutes is necessary, just as when going from one place to another in India; France is, however, in advance of us, in so far that there is only one standard time in use throughout the country and its African colonies.

In India a similar system of hour-zones could be adopted, the lines of division following the boundaries of the principal administrative divisions, as is done in the United States, Canada and Russia, but as regards the standard to be used there are three courses open. First to retain Madras time, secondly, to adopt a standard of 5½ hours in advance of Greenwich, or thirdly, to adopt the even hour time zone system.

The first of these, Madras time, is not likely to be universally adopted, and for the second the only recommendation is that it would involve a change of only 9 minutes from the standard at present in use on the Indian railways.

But if a change is to be made it is immaterial whether it is one of 9 or 21 minutes, each would be equally inconvenient at first, and the slight feeling of inconvenience would pass off as rapidly in the one case as in the other.

Against the adoption of either of these two standards, is to be placed the fact that the Indian railway system must inevitably become linked up, as has already happened to the telegraph system, with the railways of Europe and Western Asia on the one hand, and of the far East on the other. In the first of these Greenwich time is already the standard, and on the other it will probably be adopted. There would then be a change of a fraction of an hour, or of some odd number of minutes, at the junction, instead of the much simpler change of a whole hour, or perhaps no change at all.

Another objection to the adoption of either Madras time, or $5\frac{1}{2}$ hours fast of Greenwich, as the standard is that if combined with the hour-zone system it would necessitate three separate times in India. A central time would be used by Bengal, Madras, Central Provinces, North-West Provinces, Central India, Rajputana and probably, for convenience, Bombay, exclusive of Sind; western time, one hour slow of central, would be used by the Punjab, Sind and Baluchistan; while eastern time, one hour fast of central, would be used in Assam and Burma.

If, on the other hand, the hour-zone system be adopted in its completeness, using Greenwich as the starting-point, we would only have two times in India, an Eastern time, exactly 6 hours fast of Greenwich, used by Bengal, Assam and Burma, and a Western time, exactly 5 hours fast of Greenwich, used by the rest of India. Once this system was adopted the traveller in either group of provinces or presidencies would find the same time in use everywhere, and when he crossed the boundary he would but have to remember that the time was an even hour fast or slow of that he was carrying with him. At first it might seem strange to find that the mail train from Calcutta took only half an hour to travel from Buxar to Moghal Sarai, while it took, or appeared to take, two hours and a half to travel in the opposite direction, but the experience of America and Europe has shown that no real difficulty arises from this change of an even hour at certain defined places, and that people readily adapt themselves to it, more readily indeed than to the daily change of time at sea or to that immense improvement, the twenty-four hour system of reckoning time.

To understand what the adoption of the system would mean in practice let us take the case of Calcutta. In the first place we should have to put our watches back 6 minutes, and there the sum and total of all that can be considered as ad rawback ends. On the other hand, we should no longer have the clock outside the General Post Office pointing to one time, and that on the Howrah platform pointing to another. The traveller would no longer have to make an intricate calculation to find out at what time (local) he would have to leave his house to catch a train which departs at another time (Madras). If he set sail for Burma, or went up the river to Assam, he would not need, on arrival at his destination, to make anxious enquiries as to the time in use there, for it would be exactly the same as what his watch showed; and if he travelled in the other direction to Madras, Bombay or Delhi, he would only have to remember that the time there was exactly an hour slow of his watch.

The benefit would by no means be confined to travellers. The merchant in his office, receiving a telegram from London, would know by a glance at his watch, exactly six hours fast of Greenwich, how long the telegram had taken in transit. If it were from Berlin or Rome the difference in time would be five; if from New York, ten hours. The shipmaster in the Hooghly, seeing the time-ball drop, would know that it was exactly 7 A. M. by Greenwich time, and determine the error of his chronometer at a glance, and without any need for calculation. And so in every branch of commercial or social intercourse, where time has to be considered, the advantages of the adoption of standard time would be encountered at every turn.

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Proc. No. 6.]

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If this is true of the ordinary intercourse of man with man, it is especially true in all scientific investigations where the comparison of time observations at different places is required. I have myself recently had to deal with a mass of time records referring to the earthquake of 1897, and found that a large number had to be rejected because it was impossible to ascertain what standard of time had been used, while in many others it was only after a large mass of calculations had been gone through that the relation of observations, from different places, to each other could be determined.

This is an aspect of the question with which this Society is as much concerned as with the general advantages of the adoption of a standard time. It is for this reason that I have drawn up this note for the consideration of the Society, and propose that we should memorialise the Government of India to adopt a standard time for universal use in India. The standard actually adopted is comparatively an immaterial point but, as pointed out above, the balance of advantages lies with Greenwich, as opposed to any local Indian time.

The means for bringing the standard adopted into general use could be very simple. In India, as elsewhere, the initiative would have to come from the State, and the first step to be taken would be to discontinue the table, occupying 44 pages of print, in the official Telegraph Guide which shows the difference between standard and local time. This would cost nothing, it would be a slight saving of expense, and of itself would soon lead to standard time being adopted everywhere except in the Presidency towns, for, when local time could no longer be obtained from the telegraph offices, standard time would soon come into general use.

In the Presidency towns there are local observatories which give a daily time signal, and indirectly control the time in general use. These time signals should be converted to Greenwich time, a change which would be to the advantage of the shipmasters for whose benefit they are primarily intended. Added to this the standard time should be used in all Government offices and shown by all clerks directly controlled by Government.

If this were done the experience of other countries has shown that the general public would soon come to adopt the standard time, and having once appreciated its advantages, would soon wonder how they had so long endured the old system.

APPENDIX.

List of Countries, Colonies and Dependencies in which Greenwich time has been adopted as the standard civil time. Taken from Prof. Milne's table of civil times, printed in the Geographical Journal, February 1899.

Austria, 1 h. P.
 Bechuanaland, 1½ h. P.
 Belgium, G. M. T.
 Bosnia, 1 h. P.
 Bulgaria, 2 h. P.
 Canada,* 4 h. to 8 h. S.
 Cape Colony, 1½ h. P.
 Congo Free State, 1 h. P.
 Denmark, 1 h. P.
 German Empire, 1 h. P.
 Herzegovina, 1 h. P.
 Hungary, 1 h. P.

Italy, 1 h. P.
 Japan, 9 h. P.
 Korea, 9 h. P.
 Malta, 1 h. P.
 Natal, 2 h. P.
 New South Wales, 10 h. P.
 Norway, 1 h. P.
 Orange Free State, 1½ h. P.
 Pescadores, 9 h. P.
 Queensland, 10 h. P.
 Rhodesia, 1½ h. P.
 Roumania, 2 h. P.

* 1. *Intercolonial time*, Nova Scotia, Prince Edward's Island; 4 h. S.

2. *Eastern time*, New Brunswick, Montreal, Ontario; 5 h. S.

3. *Central time*, Manitoba, Keweenaw; 6 h. S.

4. *Mountain time*, Saskatchewan, Assiniboia, Alberta, Athabasca; 7 h. S.

5. *Pacific time*, British Columbia; 8 h. S.

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South Australia, 9 h. F.

Sweden, 1 h. F.

Switzerland, 1 h. F.

Tasmania, 10 h. F.

Transvaal, 1½ h. F.

Turkey, 2 h. F.

United States,* 5 h. to 8 h. S.

Victoria, 10 h. F.

West Australia, 9 h. F.

Zululand, 2 h. F.

Mr. T. H. Holland proposed:—

“That Mr. Oldham’s paper as read at the meeting should be laid before the Council for any further action that they consider necessary.”

The proposal was seconded by Major D. Prain, I.M.S., and carried by eighteen votes against one.

1. * *Eastern time*, Maine, New Hampshire, Vermont, Massachusetts, Connecticut, New York, Rhode Island, New Jersey, Pennsylvania, Maryland, Virginia, N. Carolina, S. Carolina, Georgia, Florida, 5 h. S.

2. *Central time*, Minnesota, Wisconsin, Michigan, Iowa, Illinois, Indiana, Ohio, Missouri, Kentucky, Tennessee, Arkansas, Mississippi, Alabama, Louisiana; 6 h. S.

3. *Mountain time*, Montana, Dakota, Wyoming, Nebraska, Utah, Colorado, Kansas, Arizona, New Mexico, Texas; 7 h. S.

4. *Pacific time*, Washington, Oregon, Idaho, Nevada, California; 8 h. S.

No. 7.]

No. 52 OF 1899.

Serial No. 3.

GOVERNMENT OF INDIA.

DEPARTMENT OF REVENUE AND AGRICULTURE.

 METEOROLOGY.

To

THE RIGHT HONOURABLE LORD GEORGE F. HAMILTON,
Her Majesty's Secretary of State for India.

Simla, the 10th August 1899.

MY LORD,

WITH Your Lordship's Despatch No. 204, dated 10th November 1898, were forwarded for our consideration papers from the Royal Scottish Geographical Society and the Royal Geographical Society of London on the subject of the establishment of a standard time for all India. The conclusion that we have arrived at after careful consideration of the papers is, briefly, that the time has not yet arrived for action such as that suggested by the Societies.

2. In the first place it appears to us that until a country is linked up with others there is no absolute necessity for introducing any special meridian for regulating time within its limits, and that there is no reason why it should adopt any other standard than that most convenient to itself. If that standard agreed with one of the hourly zones it would no doubt facilitate junction in due course with adjoining countries where the zonal system was in force. India, however, is at present quite isolated and when that condition ceases to exist the zonal system will have had a long trial, and if it is still in force it will be necessary for this country to adopt it.

3. A universal time has, so far as railways are concerned, already been adopted for all India, with the exception of Burma, based on the meridian of Madras, the longitude of which is now known within a probable error of less than $\frac{3}{4}$ of a second of time or about $\frac{1}{16}$ of a mile. We are of opinion that this standard should not be altered at present. The question still remains whether Madras time should be enforced all over India. We anticipate that there would be considerable practical difficulties in prescribing it at places like Bombay, Calcutta and Karachi, and if it were not enforced in these places it does not seem advisable to enforce it in other localities of minor importance where local time is employed for other than railway timing. In any case India including Burma extends over too great a longitudinal space for a single meridian to be convenient for all purposes.

4. In cases where it may be necessary to compare Indian time with that of other countries the application of the difference of longitude, even though it may not consist of an exact number of hours, offers no difficulty, nor does it seem reasonable to suggest that in the rare cases when the exact time of the occurrence of some phenomenon, such as the Assam earthquake of 1897, has to be recorded there is any more difficulty for scientific men in the application of a correction of 5 hours 21 minutes than in the use of one of 5 hours 33 minutes. Nor again can it be of any real importance to navigators that the time signal at the Presidency towns should be given at a certain whole number of hours from Greenwich. They are facile computers and when at sea have constantly to apply the difference of longitude, and their calculations in port for the purpose of rating their chronometers would not be materially simplified by the change suggested.

5. We cannot agree that a half and half measure such as that suggested by the Royal Geographical Society should be adopted. If any change were made at all we are of opinion that it should be in the direction of conformity with the hourly zone system, India being thus brought into accord with European countries with which a junction may be expected in the future. A change now to a half hour zone would almost certainly involve a second change at no very distant period, and this should, if possible, be avoided.

6. It may be admitted that a change will some day be inevitable. But in the meanwhile it seems desirable to watch the working of the different systems, and when the time for a change arrives the experience of other countries will be available as a guide to the ultimate decision. We are unable to find in the papers which we have considered any conclusive reasons, scientific or other, for immediate action, whilst, on the other hand, the difference of opinion between the two scientific societies as to what should be done seems in itself to be an argument for postponing the change until it can be made definitely once for all.

We have the honour to be,

MY LORD,

Your Lordship's most obedient, humble Servants,

CURZON OF KEDLESTON.

W. S. A. LOCKHART.

E. H. H. COLLEN.

C. M. RIVAZ.

C. E. DAWKINS.

T. RALEIGH.

R. GARDINER.

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Nos. 2703-6—66-3.

Copy, with a copy of the despatch to which it is a reply, forwarded to the

Public Works Department

Military Department

Surveyor General of India

, for information.

Meteorological Reporter to the Government of India and Director General of Indian Observatories

By order,

E. MACONOCHIE,

Under Secy. to the Govt. of India.

File No. 66 of
1898.

Serial No. 3.

No.

1899.

GOVERNMENT OF INDIA.
DEPARTMENT OF REVENUE AND
AGRICULTURE.

METEOROLOGY.

NO. 52, DATED SIMLA, THE 10TH AUGUST 1899.

(C o p y.)

*Letter to Her Majesty's Secretary of State
for India.*

SUBJECT.

Establishment of a standard time for all India.

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, SEPT. 1899.

Adoption of a standard time for all India.

[Pros. No. 8

No. 8.] No. 2987—66-4, dated Simla, the 1st September 1899.

Serial No. 4.

From—T. W. HOLDERNESS, Esq., C.S.I., Secretary to the Government of India,

To—The Honorary Secretary, Asiatic Society of Bengal.

WITH reference to your letter No. O-477, dated 22nd May 1899, regarding the establishment of a standard time for all India, I am directed to say that after a very careful consideration of the recommendation made by the Society, the Government of India have come to the conclusion that the time has not yet arrived for action such as that suggested by the Society. They consider that there would be a considerable practical difficulty in enforcing a single standard time in places like Bombay, Calcutta, Karachi or Rangoon, and they think that if it is not enforced in such places, it is not worth while enforcing it in such other places of minor importance as use their local time for other than railway time.

I am at the same time to thank the Society for having brought the subject so fully and carefully to the notice of the Governor General in Council.

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, SEPT. 1899.

Renewal for two years from 1st January 1900 of lease of "Constantia." [Pros. No. 10]

RENEWAL FOR TWO YEARS FROM 1ST JANUARY 1900 OF THE LEASE OF
"CONSTANTIA."

PROPOSED PURCHASE OF "CONSTANTIA."

No. 9.] No. 663 S., dated Simla, the 18th August 1899. File No. 60 of 1899.
From—J. ELIOT, Esq., Meteorological Reporter to the Government of India and Serial No. 1.
Director General of Indian Observatories,
To—The Secretary to the Government of India.

I HAVE the honour to inform you that the lease of "Constantia" for the accommodation of the Simla Meteorological Office, sanctioned in your letter A Pros., September 1895, Nos. 1 and 2. No. 2453—55-2, dated 5th September 1895, expires at the end of the present year, and to enquire whether the Government wish to renew the lease for another period of two years, and if not, what arrangements they would wish me to make for the accommodation of the office.

With the temporary addition of six clerks (for at least three years) and the appointment of an additional European Assistant, the accommodation in the present arrangement is limited, and it would be very desirable to add another room to the south verandah to accommodate the greater part of the increased establishment. The cost of this will be about R300 so far as I can estimate, and I am prepared to make this addition if Government will contribute half, by two annual payments of R75, in increment to the present rent, which would hence be R1,325 *plus* half taxes for the portion of the house occupied by the office.

I have the honour to inform Government that I am anxious to sell "Constantia" before I leave India. I have had tentative applications from three quarters during the present year. I have, I believe, suggested reasons why it might be desirable for Government to purchase the property. I may add that roughly the available building space I believe about as long as the ground occupied by the Public Works Building and the width about twice as great, probably sufficient for the additional Secretariat building which I believe the Government of India contemplate building at Simla.

No. 10.] No. 3031—60-2, dated Simla, the 7th September 1899. Serial No. 2.
From—E. MACONCHIE, Esq., Under-Secretary to the Government of India,
To—The Meteorological Reporter to the Government of India and Director General of Indian Observatories,

WITH reference to your letter No. 663 S., dated 18th August 1899, I am directed to convey the sanction of the Government of India to the renewal of the lease of the house "Constantia" for a further period of two years from the 1st January 1900, on the same rent and conditions as at present.

2. With reference to paragraph 2 of your letter, I am to say that the Government of India agree to your adding another room to the house to accommodate the greater part of the increased establishment on the terms proposed. Government will contribute half the cost which is estimated at R300 by two annual payments in increment of the present rent, which will then amount to R1,325, *plus* half taxes, for that portion of the house occupied by the Meteorological Office.

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, SEPT. 1899.

Pros. No. 11] Renewal for two years from 1st January 1900 of lease of "Constantia."

3. A further communication will be made to you regarding the purchase of the house by Government.

No. 3032—60-2.

COPY forwarded to the Finance Department for information, in continuation of endorsement No. 2454—55-2, dated 5th September 1895.

No. 11.] No. 3469—60-3, dated Simla, the 28th September 1899.

Serial No. 3.

From—E. MACONCHIE, Esq., Under-Secretary to the Government of India,
To—The Meteorological Reporter to the Government of India and Director General of Indian Observatories.

IN continuation of my letter No. 3031—60-2, dated 7th September 1899, I am directed to inform you that the Government of India are unable to decide at present whether it will be necessary to purchase the house "Constantia."

GOVERNMENT OF INDIA.

PROCEEDINGS

OF

THE DEPARTMENT OF REVENUE AND AGRICULTURE

FOR

NOVEMBER, 1899.

METEOROLOGY.

REPORT ON THE ADMINISTRATION OF THE METEOROLOGICAL DEPARTMENT IN 1898-99.

No. 1.

No. 3800, dated Calcutta, the 23rd September 1899.

File No. 69 of
1899.
Serial No. 1.

From—The Meteorological Reporter to the Government of India and Director
General of Indian Observatories,

To—The Secretary to the Government of India.

I HAVE the honour to submit herewith, for the information of Government, four copies of the Administration Report of this Department for the year 1898-99, just published by the Department.

(Enclosure.)

(Not printed in Proceedings.)

Extract from the Proceedings of the Government of India, Department of Revenue and Agriculture,—No. 3735 (Meteorology),—dated Simla, the 24th October 1899.

Read—

The Annual Report on the Administration of the Meteorological Department for the year 1898-99.

RESOLUTION.

THE number of departmental observatories on the 31st March 1899 was the same as at the end of the preceding year, namely, 174. During the year Nowgong was brought on to the departmental list of observatories and arrangements were made for the establishment of an observatory at Vellore in Madras. Valuable information was received as usual from the observatories at Teheran and Ispahan. Temperature and wind observations were received from four stations on the Persian section of the Indo-European Telegraph Company's line. The department is indebted to the company for the valuable assistance accorded, more especially in the transmission of telegrams free of charge from Bushire, Jask, Ispahan and Teheran, which are of use in enabling forecasts to be made of cold weather storms from Persia to Northern India. With a view to extending observatories in Assam, which was imperfectly represented in the present system of observatories, arrangements have been made to establish five more observatories in that Province from the 1st January 1900.

2. The number of observatories inspected during the year under review was larger than in the previous year, and the condition of those inspected was found on the whole to be satisfactory.

3. The special observations of storms were less numerous than in the preceding five years, owing chiefly to the comparative absence of stormy weather during the year. Special observations of thunderstorms and lightning were taken at seven departmental observatories and also at Vizagapatam and Jaipur.

4. Seismological observations were recorded during the year at Alipur, Colaba and Madras, and an account of them will be given in next year's administration report of the Meteorological Department. The Kashmir State is making arrangements to take similar observations at the Srinagar Observatory now in course of erection. A list of the more important earthquake shocks reported by departmental observers and other officers is now given in the Monthly Weather Review.

5. Observations of the direction and apparent velocity of the upper clouds by means of Fineman's nephescopes were taken at five stations. Observations with photogrameters for obtaining observations from which the average height and the rate and direction of motion of the various kinds of clouds may be estimated were taken at Allahabad, and arrangements have been made to publish in the Indian Meteorological Memoirs a statement of the complete series of these observations in the form desired by the International Meteorological Committee.

6. The work of Marine Meteorology was carried out during the year on the same lines as heretofore. The extracts from ships' logs received amounted to 2,189 and 9,906 barometric comparisons were made. The marine data were chiefly utilized in the preparation of the daily weather charts of the Indian monsoon area.

7. Fairly complete and satisfactory information of the amount, distribution and time of occurrence of the snowfall in the Himalayan and Afghan Mountain areas was received and was an aid to forecasting the character of the south-west monsoon rainfall of 1899. The acknowledgments of the Government of India are due to the gentlemen who contributed information.

8. No change was made in the system of rainfall registration. The work of registration was carried out satisfactorily, and it may be said that the data are now fairly reliable. The reports of the officers controlling the registration, however, show that the work of inspection is imperfectly carried out in several provinces and that there are still many defects in the exposure of the raingauges and the registration by the rainfall observers. The Government of India trust that the attention of Local Governments and Administrations will continue to be directed to the subject, and that the omission on the part of the responsible officer in the Punjab, noticed in paragraph 47 of the report, will be rectified in future years. A statement giving the monthly and annual rainfall in each province from 1897 is now included in the Rainfall Volume, which hence forms a complete statement of the rainfall of the empire.

9. The usual forecast of the probable character of the rainfall during the south-west monsoon of 1898 was issued, and was fairly in accordance with the facts. The same may be said of the forecast of the winter rains of 1898-99.

10. The issue of storm warnings was conducted satisfactorily by the responsible officers. Ample and early definite warning was given in the case of all the more important storms which visited the Indian Coast during the year. Flood warnings were issued as in previous years to district officers and to officers of the irrigation and other branches of the Public Works Department. Weather telegrams were supplied as usual to Indigo planters in Bihar, and their usefulness was acknowledged. A circular was issued during the year with a view to securing increased accuracy and efficiency of storm and flood warnings by enlisting the co-operation of the officers receiving such reports. Reports received from these officers show that the warnings were generally timely and satisfactory.

11. The publications of the Department were issued with regularity. The first two parts of the discussion of the Trevandrum observations have been issued and the Meteorological Reporter hopes to publish the third or last part shortly.

12. Departmental changes of some importance were sanctioned during the year which will be more fully dealt with in the next administration report. The Colaba, Madras and Kodaikanal observatories were transferred from Provincial to Imperial control and placed under the superintendence of the Meteorological Reporter, to whose designation has been added that of Director General of Indian Observatories. The number of 2nd class observatories has been reduced from 61 to 38, and steps have been taken to increase the efficiency of those retained. An additional European Officer has been posted to the Simla office to assist in the preparation of the Daily Weather Report, and the Meteorological

Reporter and his first Assistant are now in a position to devote a considerable portion of their time to the discussion of accumulated data. New buildings for the accommodation of the Imperial Office have been erected in the grounds of the Alipore Observatory.

13. Material assistance to the work of the Department was received as in previous years from the Survey, Telegraph and Postal Departments. The Department is also indebted to the Eastern Telegraph Company for the transmission free of charge of daily weather telegrams from Aden to Bombay.

14. The Government of India again desire to acknowledge the capable and energetic administration of the Department by Mr. Eliot, and the good work of his Assistants and the Provincial Reporters. As in previous years much valuable assistance has been given by gentlemen unconnected with the Department to whom the Government of India's acknowledgments are due.

ORDER.—Ordered that the foregoing Resolution be forwarded to the several Departments of the Government of India (except the Legislative Department), to Local Governments and Administrations, to the Director General, Indian Medical Service, to the Surveyor General of India and to the Meteorological Reporter to the Government of India and Director General of Indian Observatories.

Ordered, also, that it be published in the Supplement to the *Gazette of India*.

[True Extract.]

T. W. HOLDERNESS,

Secretary to the Government of India.

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, NOV., 1899.

Report on the Administration of the Meteorological Department in 1898-99. [Pros. No. 3]

No. 3.

No. 165, dated Simla, the 9th November 1899.

Serial No. 3.

From—E. MACONOCHE, Esq., Under-Secretary to the Government of India,

To—Her Majesty's Under-Secretary of State for India.

IN continuation of my letter No. 202, dated the 15th December 1898, I am directed to forward a copy of the orders reviewing the Report on the Administration of the Meteorological Department of the Government of India for the year 1898-99.

GOVERNMENT OF INDIA.

PROCEEDINGS

OF

THE DEPARTMENT OF REVENUE AND AGRICULTURE

FOR

DECEMBER, 1899.

METEOROLOGY.

GRANT OF ADDITIONAL ALLOWANCES TO CERTAIN ASSISTANTS IN THE ALIPORE OBSERVATORY FOR WORKING THE TIME-BALL AT THE KIDDERPORE DOCKS.

No. 1.

No. 4218, dated Alipore, Calcutta, the 22nd November 1899.

File No. 77 of
1899.
Serial No. 1.

From—JOHN ELIOT, Esq., Meteorological Reporter to the Government of India,
and Director General of Indian Observatories,

To—The Secretary to the Government of India.

I HAVE the honour to report that the Port Commissioners of Calcutta recently informed me that they have constructed a Time-ball at the Kidderpore docks and desired me to order the ball being worked by the staff of the Alipore Observatory. As this additional work entails additional responsibility and work on the part of that staff I pointed out to them that a small additional allowance should be paid for by them to the staff who would work the new Time-ball, and suggested the following allowances :—

	R	a.	p.	
Allowance to the Chief Observer	12	8	0	per month
Ditto to two Assistants (R7-8-0 each)	15	0	0	"
Salary of a peon	8	0	0	"
TOTAL	35	8	0	"

2. The Port Commissioners in their Vice-Chairman's letter No. 1168 of the 21st July 1899 (copy enclosed) have accepted this charge, and I now beg to ask the sanction of the Government of India to the above monthly charges being paid to the staff of the Alipore Observatory as indicated above, with effect from the 6th October 1899 from which date the work of dropping the Time-ball at the Kidderpore Docks has been undertaken by that staff under my orders.

A Pros.,
April 1887,
Nos. 3 and 4.

3. The monthly amount, R35-8-0, will be recovered from the Port Commissioners by the Comptroller of India Treasuries as is now done in the case of the allowances sanctioned in your No. 53—28-2 Met. of the 15th April 1887.

4. The telegraphic connection of the Alipore Observatory and the new Time-ball has been completed by the Electric Telegraph Department in direct communication with the Port Commissioners, all payments for which have been and will be made by them direct to the Electric Telegraph Department.

No. 1168, dated the 21st July 1899.

From—LIEUT. E. W. PETLEY, R.N., C.I.E., Vice-Chairman, the Commissioners
for the Port of Calcutta,

To—The Meteorological Reporter to the Government of India.

I HAVE the honour to acknowledge receipt of your No. 2983 of 18th July 1899 sanctioning the telegraph connection between the Alipore Observatory and the Time-ball at the Kidderpore Docks.

Pros., Met., Dec. 1899, Nos. 1 and 2.

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, DEC., 1899.

Pro. No. 2 Grant of additional allowances to certain assistants, Alipore Observatory, etc.

I beg to say that I accept the charge of R35-8-0 per mensem as additional remuneration to the Chief Observer and two Observers for the work of dropping the Time-ball, including R8 for a peon.

I will communicate with Mr. Kuchler when the various arrangements are complete.

No. 2.

No. 4339—77-2, dated Calcutta, the 12th December 1899.

Serial No. 2.

From—E. MACONOCHE, Esq., Under-Secretary to the Government of India,

To—The Meteorological Reporter to the Government of India and Director
General of Indian Observatories.

In reply to your letter No. 4218, dated the 22nd November 1899, I am directed to inform you that the Government of India are pleased to sanction, with effect from the 6th October last, the grant to the staff of the Alipore Observatory of the additional allowances as noted in the margin and the entertainment of a peon at R8 per mensem, for dropping the Time-ball at the Kidderpore Docks belonging to the Port Commissioners of Calcutta. I am to say that the expenditure should be treated as expenditure of the Meteorological Department and should be recovered regularly from the Port Commissioners by the Comptroller, India Treasuries, as is done in the case of the allowances sanctioned in Mr. Lawrence's endorsement No. 53, dated 15th April 1887.

	R	a.	
Chief Observer	12	8	per mensem.
Two Assistants	7	8	each.

Observatory of the additional allowances as noted in the margin and the entertainment of a peon at R8 per mensem, for

No. 4340—77-2.

Copy of the correspondence forwarded to the Finance Department for information.

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, DEC., 1899.

Title of Captain Fraser to "acting allowance" while on deputation in England. [Pro. No. 3

TITLE OF CAPTAIN FRASER TO "ACTING ALLOWANCE" WHILE ON DEPUTATION IN ENGLAND IN CONNECTION WITH THE MAGNETIC SURVEY.

No. 3.

No. 229 Rev., dated India Office, London, the 26th October 1899.

File No. 16 of
1899.
Serial No. 16.

From—Her Majesty's Secretary of State for India,

To—The Government of India.

* A Pros.,
March 1899,
Nos. 21 and
22.
F. 16.

IN compliance with the letter from your Government, No. 27 * of 1899, Revenue and Agricultural Department, dated the 30th March last, Captain H. A. D. Fraser was placed on deputation for two months in this country. Under Article 103 of the Civil Service Regulations, his duty pay should be "two-thirds of the salary which he would draw were he on duty in India." It is not clear whether under this rule he should be granted two-thirds of the acting allowance which he was drawing as Deputy Superintendent, 1st grade, in the Survey of India.

2. I request that Your Excellency will be so good as to inform me on this point at an early date. Pending receipt of your reply, the amount in question will not be issued to him.

I have, etc.,
GEORGE HAMILTON.

No. 4.

Telegram dated the 21st November 1899.

Serial No. 17.

From—London,

To—Viceroy.

From—Secretary of State,

To—Calcutta.

WHAT are your wishes respecting last part of my telegram in the Revenue and Agriculture Department dated 25th July last. Captain Fraser had two months on special duty; wants two more. I propose to allow if you have no objection subject to his return by October 1900.

No. 5.

No. 4093—16-18, dated the 23rd November 1899.

Serial No. 18.

From—E. MACONOCHE, Esq., Under-Secretary to the Government of India,

To—The Surveyor General of India.

† B. Aug.
1899,
Nos. 11-16.
F. 16. (P. 4
of notes.)

With reference to the correspondence ending with your telegram No. 1920,† dated 28th July 1899, regarding the deputation of Captain H. A. D. Fraser, R.E., to England in connection with the magnetic survey, I am directed to forward a copy of a telegram dated 21st November 1899, from Her Majesty's Secretary of State for India, and to enquire whether you have any objection to Captain Fraser being placed on special duty for a further period of two months.

A very early reply is requested.

No. 6.

No. 3364—S., dated Calcutta, the 30th November 1899.

Serial No. 19.

From—COLONEL ST. G. C. GORE, R.E., Surveyor General of India,

To—The Secretary to the Government of India.

IN reply to Mr. Maconochie's letter No. 4093—16-18, dated the 23rd instant, I have the honour to state, for the information of the Government of

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, DEC., 1899.

Pro. No. 7] Title of Captain Fraser to "acting allowance" while on deputation in England.

India, that I have no objection to Captain Fraser, R.E., being placed on special duty in England for a further period of two months.

No. 7.

Telegram dated the 8th December 1899.

Serial No. 20.

From—Calcutta,	To—London.
From—Viceroy,	To—Secretary of State.

YOUR telegram of 21 November last. No objection to placing Captain Fraser on special duty for two months more on the condition proposed.

No. 8.

No. 187, dated Calcutta, the 14th December 1899.

Serial No. 21.

From—E. MACONCHIE, Esq., Under-Secretary to the Government of India,
To—Her Majesty's Under-Secretary of State for India.

I HAVE the honour to subjoin copy of a telegram which was despatched to the Right Honourable the Secretary of State for India on the 8th instant, in reply to His Lordship's telegram of the 21st November 1899, and with reference to the first part of the latter telegram, to invite attention to my letter No. 110, dated 24th August 1899, in which it was said that the Government of India had no objection to Captain Fraser remaining on furlough until September 1900.

Copy of telegram.

Your telegram of 21st November last. No objection to placing Captain Fraser on special duty for two months more on the condition proposed.

Met 1. No. 13
189 9
No. 9.

213 Copies for proceedings
No. 65 OF 1899.

Met-9
Serial No. 22.

GOVERNMENT OF INDIA.

DEPARTMENT OF REVENUE AND AGRICULTURE.

METEOROLOGY.

To

THE RIGHT HONOURABLE LORD GEORGE F. HAMILTON,
Her Majesty's Secretary of State for India.

Calcutta, the 21st December 1899.

MY LORD,

In reply to Your Lordship's Despatch No. 229 (Revenue), dated 26th October 1899, we have the honour to say that we consider, having regard to the definition of "salary" in the Civil Service Regulations, that the allowance in question should be included in the emoluments on which Captain Fraser's duty pay is to be calculated. He would have drawn that allowance continuously had he remained on duty in India. The aggregate salary on which Captain Fraser's duty pay should be calculated amounts to Rs. 1,140, as detailed in the margin.

Pay	R	850
Acting allowance as Deputy Superintendent, 1st grade, in the Survey of India		150
Net Military pay		140
Total		1,140

We have the honour to be,

MY LORD,

Your Lordship's most obedient, humble Servants,

CURZON OF KEDLESTON.

E. H. H. COLLEN.

A. C. TREVOR.

C. E. DAWKINS.

T. RALEIGH.

DENZIL IBBETSON.

No. 4550-16-22 M 30/12/99

COPY of the correspondence forwarded to the Finance Department for information.

By order,

E. MACONCHIE,

Under-Secretary to the Government of India.

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, DEC., 1899.

Establishment of an observatory at Ootacamund, etc.

[Pro. No. 10

ESTABLISHMENT OF AN OBSERVATORY AT OOTACAMUND WITH A BRANCH
OBSERVATORY ON THE TOP OF THE DODABETTA PEAK.

No. 10.

No. 511, dated Ootacamund, the 2nd August 1899.

File No. 55 of
1899.
Serial No. 1.

From—J. H. A. TREMENHEERE, Esq., I.C.S., Acting Secretary to the Government
of Madras, Revenue Department,

To—The Secretary to the Government of India.

B Pros.,
July 1896,
No. 18.

IN continuation of the correspondence forwarded with Mr. Arundel's endorsement No. 278 A., dated 22nd June 1896, I am directed to submit, for the favourable consideration of the Government of India, the following proposals relative to the establishment of an observatory at a suitable situation at Ootacamund with a branch observatory on the top of the Dodabetta Peak.

2. From Mr. Eliot's letters printed in the Proceedings of this Government, No. 278, Revenue, dated 22nd June 1896, forwarded with the above endorsement, it will be seen that that officer considers that the observations at those two stations combined with those at Coimbatore would probably lead to the collection of considerable knowledge about the meteorology of Southern India, more especially during the south-west monsoon, and would be of special value. Mr. Eliot has, in consultation with the Executive Engineer, Coimbatore Division, forwarded to this Government plans and estimates* for the construction of the two observatories, from which it appears that the building on the Dodabetta Peak will cost R6,150. The observatory at Ootacamund will be a second class one recording eye observations at 8, 10 and 16 hours, and the erection of a shed for this purpose is estimated to cost R150, the total initial cost will thus be R6,300. The annual cost of the staff which it is proposed to entertain in connection with the observatories is estimated at R648, as specified on the margin.

* To be kindly returned.

	R	
Observer on (R30—40)	450	
Peon on (R12—18)	198	
TOTAL	648	

3. Having regard to the scientific value of the observations at the station, I am to say that His Excellency the Governor in Council considers the establishment of the proposed double observatory desirable, and trusts that the Government of India will see its way to sanction Mr. Eliot's proposals.

It is presumed that, as in the case of the Madras Observatory, provision for the double observatory will, if the present proposals are sanctioned, be made in the India Estimates.

No. 11.

No. 4411—55-2, dated Calcutta, the 18th December 1899.

Serial No. 2.

From—E. MACONCHIE, Esq., Under-Secretary to the Government of India,

To—The Secretary to the Government of Madras, Revenue Department.

WITH reference to your letter No. 511, dated 2nd August 1899, I am directed to convey the sanction of the Government of India to the establishment of an observatory at Ootacamund with a branch observatory on the top of the Dodabetta Peak, subject to the condition that the cost of erecting the necessary buildings and any expenditure coming under the category of public Works are met from the Madras provincial revenues. The cost of the establishment for the observatory* which is estimated at R648 per annum, and other recurring annual expenditure will be charged to the Meteorological Department (Imperial revenues).

	R	
Observer on (R30—40)	450	
Peon on (R12—18)	198	
TOTAL	648	

The plans and estimates forwarded with your letter are returned.

Pros., Mete., Dec. 1899, Nos. 10—11.

PROCEEDINGS OF THE
DEPARTMENT OF REVENUE AND AGRICULTURE, DEC., 1899.

Pro. No. 11]Establishment of an observatory at Ootacamund, etc.

No. 4412—55-2.

COPY, with a copy of the letter to which it is a reply, forwarded to the Meteorological Reporter to the Government of India and Director General of Indian Observatories for information and guidance, with the request that, as required by articles 57 and 158 of the Civil Account Code, the Government of India may be furnished with a proposition statement and a reappropriation statement showing how the extra expenditure chargeable to Imperial revenues during the current year will be met.

No. 4413—55-2.

COPY forwarded to the Finance Department for information with the remark that a proposition statement and a reappropriation statement showing how the extra expenditure chargeable to Imperial revenues during the current official year will be met, will be forwarded when they are received from the Meteorological Reporter to the Government of India and Director General of Indian Observatories.

